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NEWSPAPER

Bell Network Going Digital During Decade

By Phil Hirsch
CW Washington Bureau

BASKING RIDGE, N.J. — AT&T will spend the 1980s transforming its nationwide network from an analog system that handles only voice traffic to an integrated digital system also capable of carrying data, facsimile and video, according to a recent article in the *Bell Laboratories Record*.

Possibly the most interesting item in the May/June issue is a diagram showing the digital transmission capacity of AT&T's network in 1990. At that time, 90% of all local loops will be capable of transmitting data in digital rather than analog form; so will 90% of all local and long-distance switching facilities.

At least 25% and possibly as much as 40% of AT&T's intercity circuits will also be digital by 1990.

(Continued on Page 6)

Congress Zaps Nine-Digit Zip Until '83

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The on-again, off-again nine-digit Zip Code is off again, at least until 1983.

Congress, which had struggled unsuccessfully to stop the U.S. Postal Service's (USPS) Zip-Plus-Four program, finally pulled itself together in a strong effort to cut the plan off at its knees. In a tentative compromise worked out between House and Senate conferees on July 16, congressional opponents of the program agreed to approve USPS preparation for the program, but delayed implementation until after further congressional study.

"The Postal Service shall not implement any Zip Code system using more than five digits before Oct. 1,

(Continued on Page 6)

Union Leader Sets Sights On the Automated Office

By Ann Dooley
CW Staff

CINCINNATI — The automated office will be a target for white-collar unionizing efforts in the future, the president of the Communications Workers of America said here last week.

Speaking at a conference on "Occupational Health Issues" sponsored by the National Institute for Occupational Safety and Health, Glenn Watts said the office will be a prime target of unions partly because of declining enrollment among unions' traditional membership and partly because of increasing emphasis on improving office productivity. Moreover, he noted, white-collar employees are more interested in and educated about unions than ever before.

Unions will be addressing the bread-and-butter issues for office workers, but will also be focusing on flexible work time, child care arrangements and other issues that affect the modern automated office and office employee, he said.

While indicating that some unionizing attention would be paid to professionals and technical employees — programmers, for example — Watts said the major focus will be on clerical workers for a longer time to come.

Watts reminded an audience comprised of both management and labor that office work used to be considered safe, clean and filled with few health hazards.

"Now, we know that's not true," he stated. A changing environment brings new problems, and labor unions are committing themselves to health and safety issues in the office, Watts said.

Problems inherent in office work are only now being discovered and more will undoubtedly come to light as more research is conducted, he added.

While the paperless office may occur someday soon, the stressless of-

(Continued on Page 8)

DPers Most Wanted Of Big-Money Execs

By Bruce Hoard
CW Staff

NEW YORK — Information systems specialists will be more in demand than any other executives earning $50,000 and up over the next five years, according to a survey conducted recently by the executive recruiting firm Russell Reynolds Associates, Inc.

The survey form was mailed to 1,300 chief executive officers (CEO) of major firms throughout the country. The respondents represent the 1,000 largest U.S. industrial firms, along with the 50 largest U.S. retailers, transportation companies, utilities, banks, insurance companies and diversified financial companies, Reynolds claimed.

This year's demand for high-level information systems and DP personnel reflects "the change in management's attitude toward this area from that of merely a support function to an integral part of doing business," Reynolds said.

The area scored an index level of 106, which indicates that the percentage of CEOs expected to hire more information specialists in 1981 exceeds the number expecting to hire

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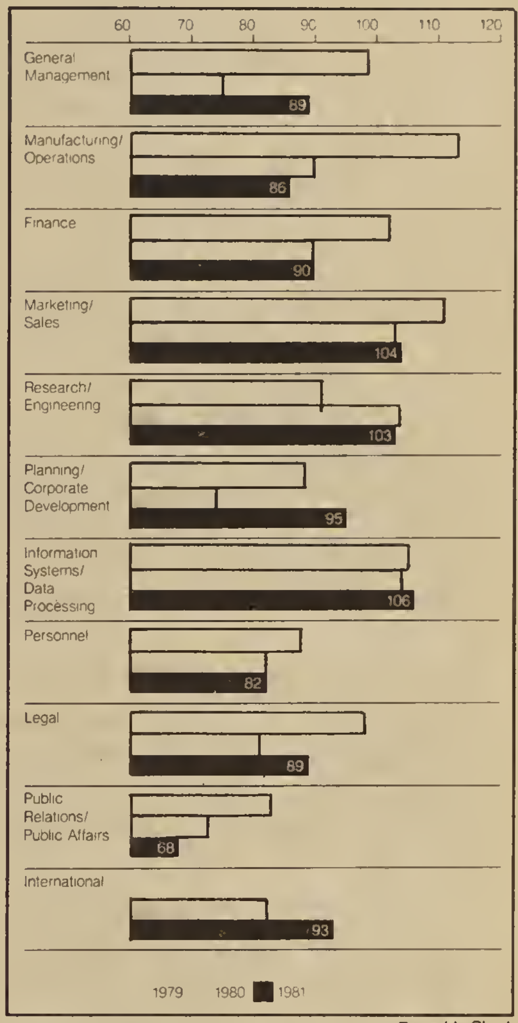

Reynolds Chart

Hiring Plans by Functional Area for Executives Earning Over $50,000

California Waging Medfly War With Computer-Aided Arsenal

By Bill Laberis
CW Staff

LOS GATOS, Calif. — A small army with a modern arsenal of helicopters, computers and poisons is waging war here against an age-old adversary — pestilence.

The Mediterranean fruit fly — Medfly, as it has become known lately — is threatening to cross its suburban boundaries and invade the lush San Joaquin Valley, striking a potential multibillion-dollar blow at California's agricultural heartland.

With some farmers already counting their losses, computers are digesting mounds of field-collected data to formulate the best strategy to save the crops and a big chunk of the state's economy, as well.

"We have every confidence that we will stop the Medfly before it spreads out of control," said Dr. Roy Cunningham, supervisory research entomologist from the U.S. Department of Agriculture and a team member of the Mediterranean Fruit Fly Eradication Project.

"But success in a project of this magnitude would be doubtful without sound computer backup to analyze and store the field findings," he added.

The size of the project to date is formidable. Since June of last year, the

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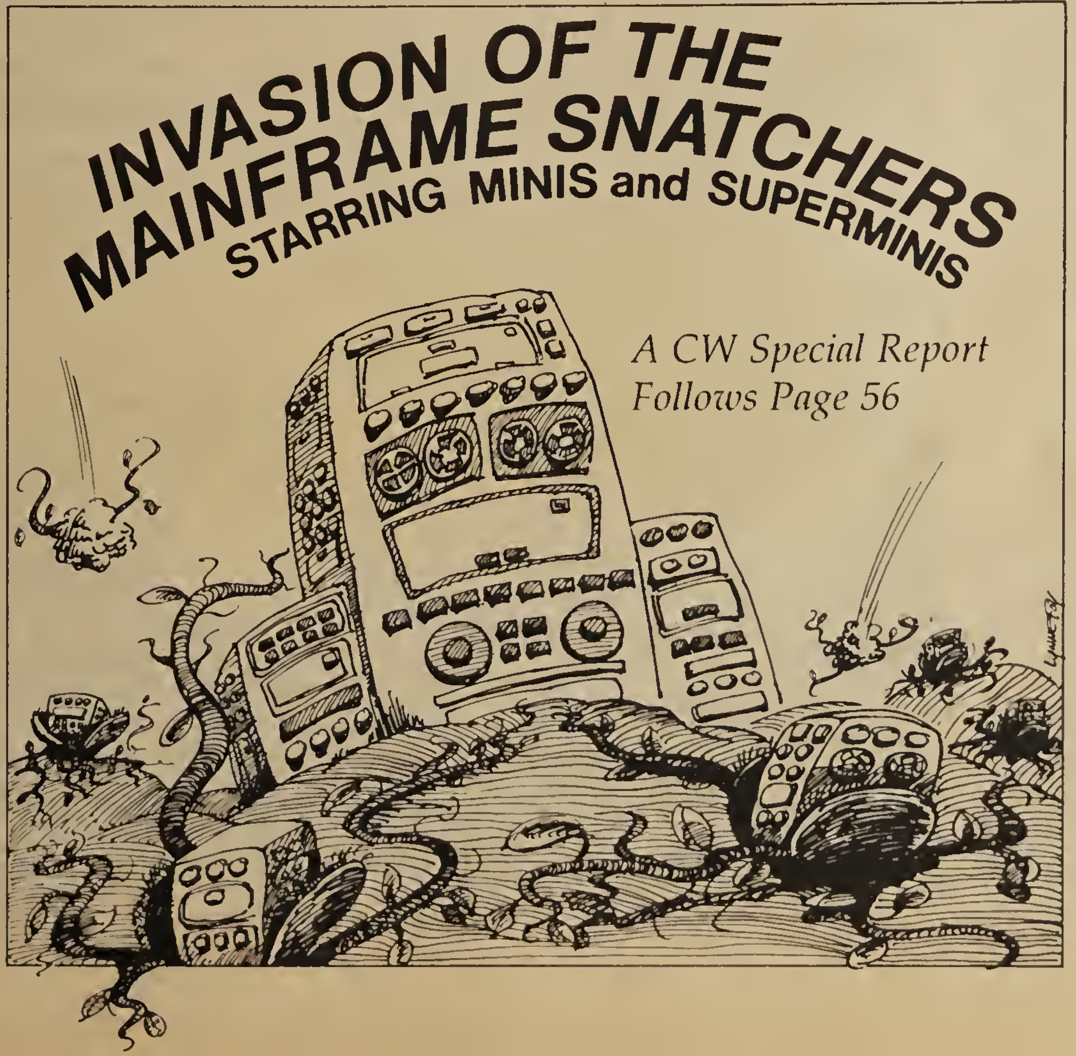
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Ohio State's Hexapod

'Horse' Set to Enter Robotics Race

By Lois Paul
CW Staff

ST.-PAUL-DE-VENCE, France — A computer-controlled machine that walks and resembles "an artificial horse" may soon come trotting out of a university research lab.

The latest advances toward building that machine were described here at Sperry Univac's seminar for the UK press by Robert McGhee of Ohio State University's (OSU) department of electrical engineering.

Speaking on the "impact of robotics," McGhee showed a film of a walking test of the OSU Hexapod, which is the latest fruit of his department's research into the development of computerized terrain-adaptive vehicles.

The six-legged machine incorporates computer-controlled communications between the human operator, who uses a two-action joystick like a pilot's control to maneuver the vehicle and the robot itself.

A communications system built into the machine transmits data regarding the terrain from its legs to a computer that is in a separate location, he explained.

First Walking Machine

McGhee noted the existence of Climbing Hoe of America, Ltd.'s Menzimuch climbing hoe, which he described as "the first commercially viable machine I would be willing to call a walking machine."

He showed footage of the Menzimuch, a man-carrying walking machine, being used to cut down and move timber on a mountainside.

"The productivity could be improved if the operator had a microcomputer assisting him to control it," McGhee said, noting that this higher level of control is the current focus of his research.

McGhee said his future work will be directed toward development of a man-carrying machine derived from the OSU Hexapod vehicle equipped with six legs, an engine like that in a Toyota or a Renault and an actuation mechanism that likely will be hydraulic.

The vehicle would be maneuvered by an operator using aircraft-type controls and would have at least one microcomputer per leg and one central processor, he said. The development problems, according to McGhee, will involve dealing with the hydraulic systems and electric motors that currently are available.

Another goal is to equip the walking machine with an artificial sense of pain, he said. Current machines, unlike their animal prototypes, are more likely to harm themselves, McGhee explained. The OSU Hexapod already has torn its front legs off, he added.

Uses for mobilized robots include space assembly, such as that being developed in conjunction with the National Aeronautics Space Administration's Space Shuttle project, pipe inspection in nuclear plants and work such as timber collection in mountainous forested regions.

McGhee said that until 1943, the U.S. Army used pack mules to transport heavy materials over difficult terrain. Each could carry only 250 pounds, was often difficult to manage and required "fuel" in the form of hay that was bulky to transport, he added.

The quest for an "artificial horse" began at this point, McGhee suggested. The USSR and Japan have been working on similar projects. The latter recently developed a quadruped with tactile sense incorporated into each leg, but no human communication. McGhee cited this as a disadvantage of the machine, which he said also has an inferior sense of stability because of its two fewer legs.

Image Processing

Another phase of robotics that was discussed was image processing, described by Dr. Michael Duff of University College in London.

In explaining the use of machines to match some of the properties of human vision, Duff described the cellular logic image processor 4 (Clip 4) system, which currently is in the testing stage in his image processing group.

Possible applications of the Clip 4 system, which Duff said is used to "interpret pictures in terms of what we know they contain," are in areas as varied as forensic science, where it can be used to study fingerprints, and tailoring, where it can determine the best way to put pieces of cloth together to make a man's suit with the least amount of wasted material.

Dr. David Thomas of the UK's Science Research Council and Rutherford Laboratory, described his government's efforts to fund projects such as Clip 4 and the interactive computer facility, a network linking universities and polytechnical engineering schools throughout the UK.

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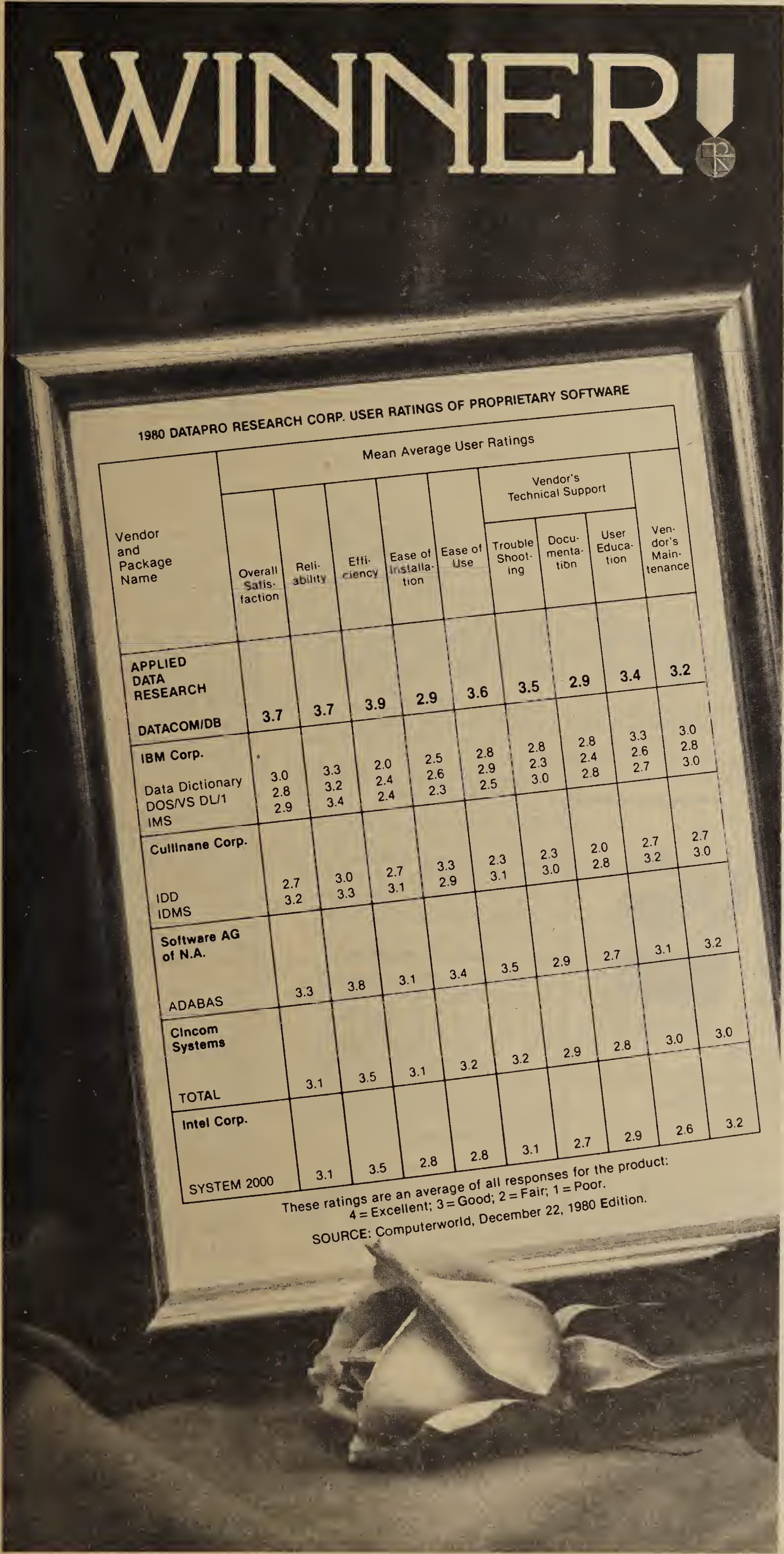

1980 DATAPRO RESEARCH CORP. USER RATINGS OF PROPRIETARY SOFTWARE

Vendor and Package Name	Mean Average User Ratings								
						Vendor's Technical Support			
	Overall Satisfaction	Reliability	Efficiency	Ease of Installation	Ease of Use	Trouble Shooting	Documentation	User Education	Vendor's Maintenance
APPLIED DATA RESEARCH **DATACOM/DB**	**3.7**	**3.7**	**3.9**	**2.9**	**3.6**	**3.5**	**2.9**	**3.4**	**3.2**
IBM Corp. Data Dictionary DOS/VS DL/1 IMS	3.0 2.8 2.9	3.3 3.2 3.4	2.0 2.4 2.4	2.5 2.6 2.3	2.8 2.9 2.5	2.8 2.3 3.0	2.8 2.4 2.8	3.3 2.6 2.7	3.0 2.8 3.0
Cullinane Corp. IDD IDMS	2.7 3.2	3.0 3.3	2.7 3.1	3.3 2.9	2.3 3.1	2.3 3.0	2.0 2.8	2.7 3.2	2.7 3.0
Software AG of N.A. ADABAS	3.3	3.8	3.1	3.4	3.5	2.9	2.7	3.1	3.2
Cincom Systems TOTAL	3.1	3.5	3.1	3.2	3.2	2.9	2.8	3.0	3.0
Intel Corp. SYSTEM 2000	3.1	3.5	2.8	2.8	3.1	2.7	2.9	2.6	3.2

These ratings are an average of all responses for the product:
4 = Excellent; 3 = Good; 2 = Fair; 1 = Poor.

SOURCE: Computerworld, December 22, 1980 Edition.

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Computer

For Distributed Processing

Program Products Added for 8100

By Tom Henkel
CW Staff

WHITE PLAINS, N.Y. — After announcing three more processors and operating system enhancements for its 8100 line two weeks ago, IBM dropped the other shoe by announcing six program products designed to make the 8100 easier to operate in a distributed processing environment.

The announcement appears to underline IBM's intent to make the 8100 the firm's showcase distributed processor.

The six program products introduced include a Terminal Access Facility, Information/System for Virtual Machine/370 (VM/370) and Virtual Storage Extended (VSE), Network Problem Determination Application Version 2, the DPPX/Problem Determination Application, Host Command Facility Version 2 and the DPPX/Programmed Operator Facility.

Terminal Access Facility

The Terminal Access Facility is used with IBM's Network Communications Control Facility (NCCF) to allow a single master terminal operator to control IBM's IMS/VS data base management system and CICS/VS networks. In addition, the terminal access facility reduces the need for multiple operator terminals and permits control of multiple 8100 processors operating under Version 2 of the DPPX operating system, IBM said.

The interactive Information/System for VM/370 and VSE offers users regularly updated tapes containing current technical information on either the VM/370 or DOS/VSE operating systems. IBM offers a similar program product for its MVS users, Information/MVS, which has been expanded to provide technical and planning information on VM/370, DOS/VSE and OS/VS1, IBM said.

The Network Problem Determination Application (NPDA) Version 2 is a management facility that monitors network locations and notifies operators of error situations or problem conditions. The program product also collects, organizes and displays error statistics on network hardware and software components and recommends corrective actions to be taken, according to IBM.

A similar program product was also announced for the 8100's DPPX operating system. Called the DPPX/Problem Determination Application, the program product monitors DPPX application programs and provides alerts to network operators via the NPDA facility, IBM said.

Also announced for the DPPX operating system is Version 2 of the Host Command Facility (HCF V2). Used with the terminal access facility, the feature allows an operator at an NCCF terminal to simultaneously control multiple remote 8100 systems. This, IBM said, consolidates network control functions and reduces the need for additional operator terminals

A DPPX/Programmed Operator Facility was also announced for use with HCF V2. The program product automatically routes messages to the network operator or provides an 8100 operator-preprogrammed response to help correct problems. IBM said the facility makes it easier to manage networks comprised of 8100 systems.

Prices and Availability

For users of MVS system control programming, the Terminal Access Facility and HCF Version 2 are scheduled to be available in the first quarter of 1982. For use in the OS/VS 1 and DOS/VSE environments, the products will be available in the second and third quarters of 1982, respectively. The program products cost $68/mo and $150/mo, respectively.

The latest version of the NPDA will be available in the fourth quarter of 1981 for MVS and OS/VS1 users. It will be available in the first quarter of 1982 for DOS/VSE users and will cost $80/mo, according to an IBM spokesman.

The DPPX Problem Determination and DPPX/Programmed Operator Facility will be available in the first and second quarters of 1982, respectively. The DPPX/Problem Determination Application costs $25/mo and the DPPX/Programmed Operator Facility costs $580 for a one-time license fee.

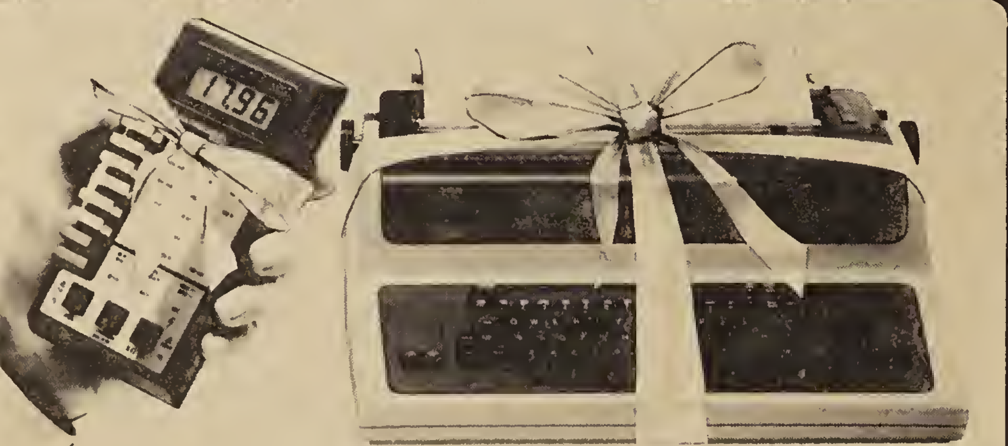
Information/System for VM/370 and DOS/VSE and Information/VM-VSE will be available in the third quarter of 1981. The monthly license fees are $52 and $110 a month, respectively. The expanded Information/MVS will also be available in the third quarter for $176 a month, IBM said.

Products Allow Central Control

The six 8100 program products introduced recently by IBM make the 8100 the easiest distributed processing system to use because it can now be controlled by one or two trained operators at a central site, according to a consultant who specializes in installing 8100 networks.

The processors can basically run themselves, Bill Ackerman of DPX, Inc. in Cupertino, Calif., said. Ackerman also said the enhancements put IBM far ahead of its competition — Data General Corp. and Datapoint Corp., for example — in the Systems Network Architecture distributed market.

However, those less enthusiastic with the 8100, like The Yankee Group's Gerard Hallaren, said the program products simply supply features that were either obviously missing from the 8100 or never worked properly.



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MPG Interfaces Ramis II DBMS To IBM's DL/1

PRINCETON, N.J. — Mathematica Products Group (MPG) has interfaced its Ramis II data base management system (DBMS) to IBM DL/1 data bases in DOS/VS and DOS/VSE environments.

The announcement fits into MPG's ongoing policy of making all Ramis II capabilities available in and portable across all IBM operating environments, according to Frank Fish, director of marketing. Automatic Ramis II interfaces to IMS data bases in batch and interactive modes under OS with IBM's Time Sharing Option (TSO) and on-line under IMS/DC, have been available for several years, another spokesman explained.

The Ramis II DBMS has also been operating in DOS environments for some time, but the automatic interface makes Ramis II's English-like nonprocedural language available "to translate DL/1 data into meaningful management reports" for the first time, Fish said.

Once the DL/1 structure is described to the Ramis II directory, all reporting facilities, including modeling and business graphics, become available for use against DL/1 files, MPG said. The DL/1 interface, which supports multiple physical and logical data bases and secondary indices makes "only the minimum number of DL/1 calls needed to retrieve the requested data," MPG's spokesman claimed.

Development of the interface product is a continuation of another company policy to facilitate transition to Ramis II by interfacing it with other major DBMS, Fish said. These include Software AG's Adabas, Total from Cincom Systems, Inc. and the Integrated Data Management System (IDMS) from Cullinane Data Base Systems, Inc., as well as conventional Qsam, Isam and Vsam files.

Noting that information in these file structures can be networked with Ramis II files to support any relationship inherent in the data of an organization, Fish claimed the interface packages make "easy access to and integration of all corporate information a reality."

Available immediately, the Ramis II-DL/1 interface costs $3,500. Additional information is available from MPG at P.O. Box 2392, Princeton, N.J. 08540.

Siggraph/81 Meet Kicks Off Monday

DALLAS — Siggraph/81, the eighth annual conference on computer graphics and interactive techniques, will be held here Aug. 3-7. It is sponsored by the Association for Computing Machinery (ACM).

The conference will feature the presentation of 34 papers prepared by leaders in the computer-aided design and manufacturing, business and scientific computer graphics fields.

The registration fee for the conference is $170 for ACM members and $80 for ACM student members. The fee for nonusers is $200, ACM said from the conference office at One Illinois Center, 111 E. Wacker Drive, Chicago, Ill. 60601.

As Boredom, Stress Increase

Computer Found Cutting Worker's Tie to Job

By Brad Schultz
CW New York Bureau

CAMBRIDGE, Mass. — Computerization may make employees less loyal to their organization, bored with their jobs and under more stress than ever, according to a researcher here at MIT's Sloan School of Management.

Airline pilots who took pride in making complex decisions now resent surrendering much of that role to computer devices in the cockpit. Bill collectors accustomed to judging themselves on the basis of familiarity with accounts are less than thrilled by computer systems that organize account information, set collection agendas and minimize need for personal interactions.

Data analysts are alarmed by the blind faith some senior managers have in the validity of computer generated information. Linotype operators miss the challenge of wrestling with clumsy manual equipment, now that CRT terminals are installed as the means of specifying printer output.

These examples suggest that computerization may seriously undermine employee morale while intended to raise an organization's productivity, according to Shoshanah Zuboff in a recent paper published by MIT Sloan's Center for Information Systems Research.

Good Reasons

Companies often have good reasons for shifting employees into computer-mediated work environments, Zuboff emphasized. Computerization can expand markets, enhance services and products and improve management of complexity, she pointed out.

But managers should recognize that computerization changes the way employees view their organization and may reduce incentive to avoid mistakes. Some workers even feel that more mistakes with computer equipment will prompt managers to switch back to the manual methods the workers remember fondly, Zuboff said.

Many professionals enjoy dealing with limited, ambiguous information rather than volumes of rigorously defined computer data, she observed, because the former calls for more creative handling on their part.

"The uncertainty of limited information may lend itself to errors of judgment," Zuboff wrote, "but it also provides a 'free space' for actions that feel inspired. This free space is fundamental to the psychology of professional work — it is the reason that most people would prefer being professionals to assembly line workers."

The MIT Sloan researcher added that "When skills are no longer needed, especially in situations where the computer system is already experienced as vast or incomprehensible, people begin to feel insignificant and overwhelmed.

"This situation can exacerbate the issues of power and powerlessness that haunt all levels of organizational life."

Many managers regularly look for ways to increase control over the work process, Zuboff added, but the more managers try to extend their control, the more employees look for ways to gain "some personal sense of mastery" by subverting the managers' control.

Hence, computerization that is intended to tighten control commonly breeds resistance among workers, ironically making the organization less controllable than before.

The research paper identified a shift under way in the work place's "center of gravity" from "jobs that require bodily involvement to those that require cerebral involvement." But this shift has not made the affected jobs necessarily more interesting, varied and challenging, Zuboff maintained.

Stress-Related Ills

In fact, many people whose jobs have been transformed by computerization seem to suffer more from stress-related physical ailments, she indicated.

Some workers complain about continual computerized surveillance on the job. AT&T workers reportedly have viewed computerization as threatening the "old 'Ma Bell' familial culture."

Bell workers organized a Job Pressures Day to protest the oversupervision, stress and discipline largely imposed on them by computerization, Zuboff stated.

These organizational impacts of computerization were not anticipated by managers in many organizations, she noted. As computerization continues, managers should try to understand the psychological consequences and plan new methods for training and rewarding employees.

Zuboff's paper, "Psychological and Organizational Work" may be purchased for $2 from the Center for Information Systems Research, Sloan School of Management, MIT, 50 Memorial Drive, Cambridge, Mass. 02139.

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Bell Moving Toward Integrated Digital Net

(Continued from Page 1)

The diagram is part of an article that describes how Bell will convert its analog system into an integrated digital network capable of handling voice, facsimile, data and video during this decade.

The article, entitled "The Bell System — On Its Way to a Digital Network," was written by Warren E. Falconer, director of the Transmission Facility Planning Center at Bell Laboratories, and Casimir Skrzypczak, director of fundamental network planning at AT&T.

Although the first commercial service offering of Bell's Integrated Switched Digital Network (ISDN) is still at least a few years away, one possible candidate, according to the article's authors, is an alternate voice/data transmission service allowing the user to switch from analog to digital transmission and back again by depressing buttons on a Touch-Tone telephone keypad.

This feature would be paticularly helpful if, in the course of a conventional phone call, a user wanted to encrypt what he was saying or decided to send the party at the other end a facsimile copy of the document they were discussing.

Other potential uses of alternate analog/digital transmission capability, according to a paper presented at a recent technical conference on the ISDN, involve high-speed data communications, teleconferencing and slow-scan TV.

The code generated by depressing the Touch-Tone buttons would tell the equipment at the subscriber's local switching office to establish a digital or analog circuit path through the network conforming to the voice or data message the user wanted to send. Bell's Common Channel Interoffice Signaling System (CCIS) will be the conduit through which this setup information travels through the network.

At the moment, CCIS interconnects long-distance switching centers; like other components of ISDN, however, CCIS is gradually spreading through the network. "By 1990, some 80% of customer lines will have access to local offices that use CCIS," Falconer and Skrzypczak wrote.

A more sophisticated version of the alternate analog/digital transmission scheme is the capability of transmitting analog and digital signals simultaneously over a subscriber's local loop. According to Falconer, most existing loops can support data transmission up to 4,800K bit/sec along with voice telephone service.

Furthermore, the data channel can be subdivided to support very low-speed applications — such as remote meter reading — along with low-speed terminals. This capability is likely to be demonstrated for the first time in 1983, as part of a videotex trial in Miami sponsored by Knight-Ridder Newspapers and AT&T.

It requires only "relatively minor modifications" of the local loop and a stored program-control (SPC) switching system in the subscriber's local exchange office to provide alternate analog/digital transmission capability, Falconer explained in a recent interview with *Computerworld*. The key ingredient is the electronic versatility of the SPC switch. In 1980, 40% of all Bell System local loops were connected to such systems; by 1990, the figure should be 90%.

Baseband Transmission

To transmit a baseband digital signal over a nonloaded subscriber loop is technically simple, Falconer added. The echo suppressors used for analog transmission have to be disabled, but this can be done by the local office switch, in response to the coded signal mentioned earlier, which would be input by the user through his telephone.

"Eighty percent of Bell's existing local loop plant consists of nonloaded circuits," Falconer explained. "Depending on the wire gauge, these facilities can transmit data at rates up to 56K bit/sec for distances of more than four miles. Since the vast majority of users in urban areas are three miles or less from a local switching center, these facilities should be more than adequate to handle digital data streams.

In suburban areas, where the subscriber is generally more than three miles away, and frequently more than four miles away from his local switching center, a Subscriber Loop Carrier System (SLC) can be used.

The equipment now being installed by AT&T is the SLC-96, essentially an analog-to-digital converter and multiplexer/demultiplexer. The unit is installed at an intermediate point between a local exchange office and a group of remote subscribers. They are connected to the SLC-96 by conventional local loops, and the SLC-96 is connected to the local office by up to three T1 coaxial cables.

Voice messages from the subscribers flow through the local loops to the SLC-96, are digitized at that point, multiplexed on a T1 cable and demultiplexed when they reach the local exchange office. The reverse of each step occurs when messages flow in the other direction. If the subscriber wants digital transmission, it can be provided through the existing local loop.

The SLC-96 will be used to meet "perhaps one-third of all new local demand" generated during the '80s, Falconer and Skrzypczak said in their *Bell Laboratories Record* article.

Congress Zaps Zip Until 1983

(Continued from Page 1)

1983," the agreement read.

The compromise, worked out by House and Senate conferees as part of the larger federal budget process, should be clarified before reaching final action, which is expected by the end of this month. It is not clear, for example, how "implementation" will finally be construed.

But the agreement is unlikely to permit the Postal Service to offer the half-cent per piece rate incentive proposed for large mailers using the longer Zip Codes before 1983. And without the rate incentive, there is no future for Zip-Plus-4.

Zip-Plus-4 now faces the most serious challenge of its troubled existence. After numerous delays, USPS last month began implementation of the plan, promoting it publicly and offering computer tapes of the new Zip Code data base to mailers wanting to convert their files to the longer numbers. Those mailers now face delays of up to two years before the plan goes into effect.

The conferees also agreed to direct the General Accounting Office to study the program and report back on its effectiveness by Dec. 31, 1982. This would give Congress the chance to further alter or perhaps kill the program before the following year's full implementation date.

New Telpak Set Early Next Year

SYRACUSE, N.Y. — A new Telpak service to replace the recently terminated AT&T offering will become available in the first quarter of 1982.

Eastern Microwave, Inc., headquartered here, will be the carrier. General Manager Art Perkins said the rates for Eastern's new service will be close to those charged by the phone company just before the demise of its Telpak tariff.

Eastern, a specialized common carrier, operates in New York, Pennsylvania and adjoining states. One leg of its network runs from Philadelphia through New York City and Pittsburgh to Cleveland. Other legs interconnect New York City and Boston, Buffalo and Rochester and Syracuse and New York City.

"We're now overbuilding 240 circuits onto the New York to Boston leg," Perkins reported, "and they should be available by the first quarter of next year." Similar expansions are scheduled on all the other portions of the network. These circuits will become available beginning the first quarter of 1983, he added.

About 80% of the circuits being added between New York City and Boston have not yet been contracted for, Perkins said, and all of the capacity being added between the other cities is available.

The customer must contract for a minimum of 60 circuits, he explained. The likely price, subject to Federal Communications Commission approval, will range from around 30 cents to 52 cents per circuit mile, plus termination and local-loop charges. Perkins said the 30-cent rate will apply if the customer contracts for about 600 circuits. Termination charges will be approximately $25 per circuit end.

Perkins reported that Eastern has installed microwave local distribution facilities in New York City permitting its customers to communicate directly with the company's long-haul network, so they do not have to go through telephone company-provided local loops. Similar line-of-sight microwave bypasses are planned for the other cities that Eastern serves.

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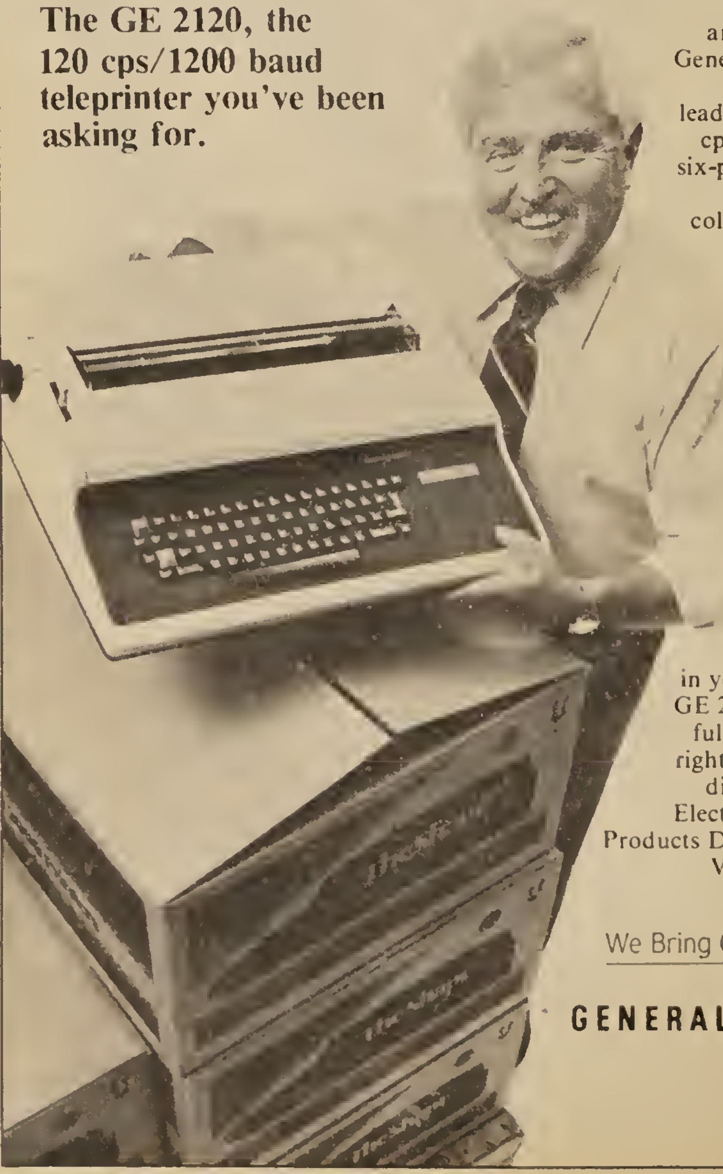

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Senate Unit Passes Its Version

House Poised to Draft Its Rewrite of 1934 Law

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The House of Representatives Communications Subcommittee will begin drafting its rewrite of the 1934 Communications Act in September, Chairman Tim Wirth (D-Colo.) said last week. Wirth's announcement came shortly after the Senate Commerce Committee passed S. 898, the Communications Act rewrite bill it had been considering since April.

The chairman of the Senate committee, Robert Packwood (R-Ore.), has indicated he expects a final Senate vote on S. 898 early in September, but South Carolina's Sen. Strom Thurmond may force a delay in that vote. Thurmond, chairman of the Senate Judiciary Committee, has said he wants S. 898 referred to his group before it goes to the Senate floor.

Thurmond has asked the Senate leadership to delay the floor vote until he and Packwood have discussed the referral request. That could delay final Senate action on S. 898 until mid-October, according to a knowledgeable source.

Thurmond, backed by much of the computer industry, has stated he believes S. 898 will adversely impact the government's antitrust case against AT&T. The major complaint involves the "separate subsidiary" provisions; they force some reorganization of AT&T, but keep the existing Bell Systems intact.

The Justice Department is insisting in the trial that the only way to achieve true competition in the telecommunications industry is by forcing AT&T to sell off Western Electric, Bell Laboratories and other key affiliates.

'Deregulation Day' Won't Bring Price Hikes, AT&T Announces

WASHINGTON, D.C. — Monthly charges for terminal users who have signed two-, four- or six-year contracts with AT&T will not change after "deregulation day" next March 1, the company has announced.

Beginning on that date, AT&T-supplied terminals will be gradually detariffed and a new, deregulated, separate subsidiary will set prices and other terms, according to an AT&T spokesman.

Initially, the "separate sub" will be involved only with new terminal installations, but later it will take over the contracts covering long-installed equipment. Among them will be Variable Term Pricing Plans (VTPP) and Two-Tier Pricing Plans. Each plan contains options under which the user's monthly payment is fixed for periods of up to 10 years.

The Dataspeed 4540 terminal is one of those covered by VTPP. Some Bell operating companies lease earlier versions of the Dataspeed family, as well as teleprinters, under Two-Tier contracts.

Archie J. McGill, AT&T's vice-president of business marketing, said there will be no change of price after March 1 for any customer who has signed a VTPP or Two-Tier contract before then that specifies a fixed payment for an extended period.

However, prices associated with month-to-month payment plans will be "subject to change," McGill said.

In the case of Two-Tier Pricing Plans, while the fixed charges — covering the terminal and its installation — will not be altered, the variable (Tier B) charges, covering maintenance and related services, will not be guaranteed.

ACM and IEEE Honor Clark

NEW YORK — The 1981 Eckert-Mauchly Award, given for technical contributions to computer and digital systems architecture, has been awarded to Wesley A. Clark, an independent consultant.

The award, carrying a $1,000 certificate, is presented annually by the Association for Computing Machinery (ACM) and the Computer Society of the Institute of Electrical and Electronic Engineers.

Clark joined the Whirlwind Computer Project at MIT in 1952 and for the following 12 years participated in various MIT computer development activities as associate group leader of the Digital Computer Group at Lincoln Laboratory.

At Washington University in the '60s, Clark directed the development of macromodular systems and their application to problems in biomedical research.

He also participated in the very large-scale integration research program at the California Institute of Technology and has continued as a consultant to the department of computer science there since 1980.

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Information Specialists Top Most-Wanted List

(Continued from Page 1)

fewer managers. Twenty-five percent of the respondents expect an increase.

Demand is also expected to be strong for executives with backgrounds in marketing, sales and research and engineering. Those areas finished closely behind information systems and DP, registering index levels of 104 and 103, respectively.

Survey results augured most poorly for senior executives in personnel and public relations/public affairs, with 40% of the CEOs expecting to hire fewer PR specialists and 33% expecting hiring to decrease for personnel specialists.

Five-Year Outlook

The five-year outlook is also rosy for information pros, survey results predicted. One-half of respondents expect an increase in demand for information systems specialists, compared with 39% last year. Runners-up for this period include marketing and sales, finance and corporate planning and development, in that order.

Despite a decreasing population, the Northeast region of the country came out of the survey as the most fertile executive hiring ground both overall and for information systems experts and DPers in particular..

"The demand for senior executives is expected to be strongest in the Northeast, where the outlook for executive hiring is also showing the most improvement," Reynolds said. The index rating there shot up from 94 to 108 in the past year and 34% of the CEO respondents said they expect to hire high-level managers during 1981.

DP Prospects

Focusing specifically on information systems/DP prospects, the survey found 24% of the CEOs in the Northeast expect to hire more people in the near future, 36% will hire the same number and 26% predicted less hiring.

The Midwest, which is not known as a haven for information processing, was second to the Northeast in terms of likely new hires. The West, an area encompassing California's Silicon Valley, finished last, with only 8% of responding CEOs indicating they would be hiring more information systems/DP executives.

However, as is often the case in regional figures, response may be low and thus not representative. A spokesman for Reynolds admitted as much, saying: "It's hard to make a conclusion based on these figures."

The "1981 Survey of Senior Executive Demand" is available free from Russell Reynolds Associates, Inc., 245 Park Ave., New York, N.Y. 10167.

This Recruiter Takes Exception To Findings

The president of one of the country's largest executive search firms disagrees with some of the findings of Russell Reynolds Associates, Inc.'s recent survey.

Mike Parr, president of Source EDP, said it is "not particularly true" that the Northeast is the most lucrative region for high-paying information system/DP jobs. The Southwest is also booming, he said.

Parr termed "ludicrous" the Reynolds survey's assertion that the West would be lowest in new hiring.

Little High Pay

In fact, Parr thinks there are very few high-paying positions in informations systems and DP available anywhere. "It's highly unusual that an individual contributor would be found in the 50K-plus range," he observed. "It is even fairly unusual to find management people there except in the larger computer installations."

Parr agreed with the survey's assertion that high mortgage rates are the biggest stumbling block to relocation. The problem is not in coming up with the money to buy a new house, but finding someone else who can afford to purchase the house being vacated, he said.

Office Called Union Target

(Continued from Page 1)

fice will not, Watts said. It is not just the highly paid executive who is undergoing stressful conditions in the office, he claimed. Recent studies have shown secretaries and other automated office workers experience more stress than any other profession, including air traffic controllers.

Automated techniques are making office workers feel as though they are in a factory, he said. No longer working on the more traditional one-to-one basis in the office, some automated office employees are beginning to feel like production workers, answering to numerious "bosses" and producing only a portion of the final product, Watts reported.

No Cure-All

Modern technology is proving to be no cure-all for the problems associated with job stress and job safety. In fact, this new wave of technology brings its own special brand of tension and job pressures, Watts said.

Commenting on the sometimes reported link between radiation and CRTs, Watts stated unions using that fear as a bargaining point are "making a big issue out of it without any facts."

Watts, who represents some 600,000 clerical, technical and semiprofessional employees, acknowledged that most large employers are enlightened and responsive to employees' needs. Speaking from a union standpoint, Watts stated the paperless office and stress in the office will be a rallying point in terms of the work place.

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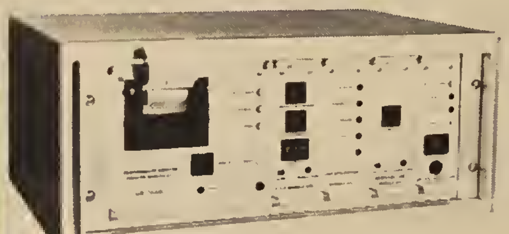

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California Computers Aid Battle Against the Medfly

(Continued from Page 1)

project team has released about four billion sterile fruit flies into the 400 square-mile area of the Santa Clara Valley. The object was to inundate the valley with nonproducing mates for the fertile native flies.

The Medfly has come to settle and multiply in the now-suburban valley after some individual brought contraband fruit home from abroad, Cunningham said. The area's decorative fruit trees provided an ideal breeding ground for the Medfly.

Catching Flies

Cunningham and his crews released four different colors of dyed sterile flies into the valley. and set out thousands of traps to catch them.

Field workers on a weekly basis would empty the traps, sending reports of their findings back to the team's makeshift headquarters in an old schoolhouse here. Computer operators then input the findings into the team's battery of Digital Equipment Corp. Decwriters, which were connected on-line with the IBM mainframes of The Service Bureau Co., Cleveland, a service division of Control Data Corp., according to Robert Palmer, systems analyst with the Medfly project. The bureau's 370/168s and 3031 CPUs running on the MVS operating system then performed a programmed analysis.

"We had programmed a map grid of the targeted areas and then fed in the field data — the dates of the finds, location, types of flies caught and so on," he said. "The traps' total catch told the system how well the sterile flies were penetrating an area, while the kinds of flies inside were analyzed to show how far the different flies had traveled to get to where they were caught."

The system then mapped out which areas needed more sterile flies released to obtain the desired 100:1 sterile fly to native fly ratio.

But last month a few nonsterile flies were found outside the Santa Clara Valley, perilously close to the rich farming districts to the south and west. The sterile fly program failed in part because the team did not take advantage of the breadth of its computer resources, Cunningham indicated. Also, the team had all but exhausted the world's supply of available sterile fruit flies.

"Even now we are not at the stage where we would like to be with our computers," he remarked. "We could really have used a couple other data bases during the sterile fly release."

Two such data bases, he said, were a collection of data relating to the actual infestation of fruit in different parts of the state and a composite mapping of discrete areas where the sterile fly release program was tried.

The team has begun using what may be the last weapon in the arsenal, the spraying of food-enriched malathion, a common pesticide.

Again the traps have been set out, and again the field teams are sending back their weekly finds to team headquarters. But this time the system is taking special note of the traps containing the most flies, for they indicate areas where stepped-up spraying is required.

The second of four planned sprayings began last Thursday in an attempt to break the 30-day life cycle of the females, each capable of laying up to 500 eggs that hatch into fruit-devouring maggots.

"We can lick this thing if we spray in the right places and in the right amount," Cunningham said. "We got hurt in the sterile fly release because we didn't have the where-with-all and resources to know how to best spread the treatment.

"So far this project has cost taxpayers $20 million. If it [the Medfly] gets to the farm country, we will measure the damage in billions."

Memorex, STC Prices Up

SANTA CLARA, Calif. — On the heels of price hikes made earlier this month by IBM, both Memorex Corp. and Storage Technology Corp. (STC) have raised prices for their storage subsystems.

Memorex last week raised the prices of its 3650 and 3652 disk subsystems. The 3650 is the plug-compatible equivalent of the IBM 3350 and the 3652 is a double-capacity version of the 3650.

The increases, effective last Tuesday, vary by model, with a maximum 14% increase on lease rates and a maximum 6% increase on the purchase price. No increases were made for maintenance.

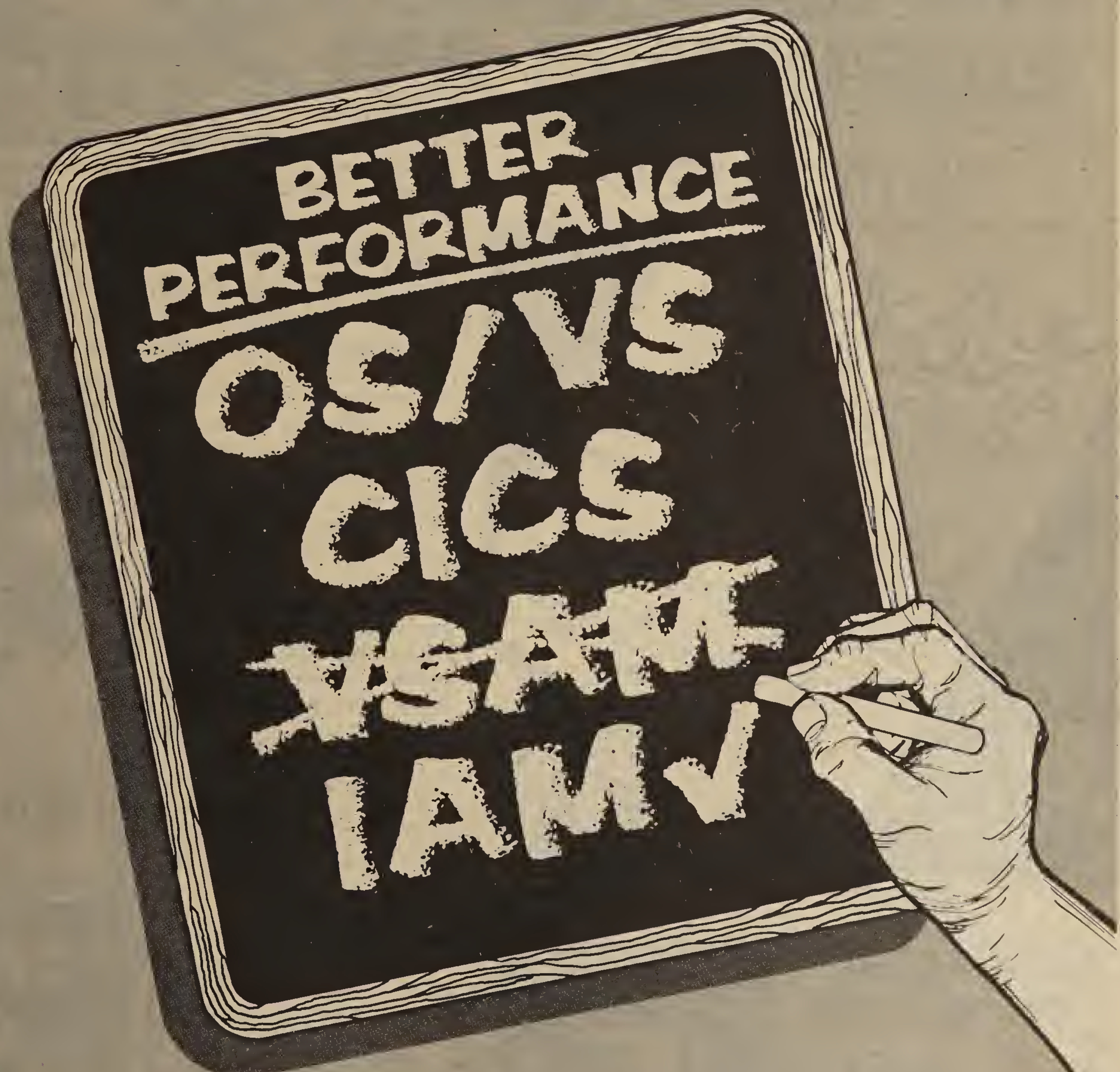
Subsystems already on order and scheduled to be shipped before the end of the year were not hit by the price increases. Memorex said the order rate for these products is very strong, with the largest backlog in the company's history.

STC raised the purchase prices of its 8360, 8370 and 8880 disk subsystems by 5%. Moreover, the company boosted lease prices by 7% across the board for all disk subsystems and increased maintenance prices for all major tape products by 15%.

Those price increases are effective Oct. 1.

IBM's price hikes for disk subsystems were generally 7% on purchase, with the models 3310 and 3380 exempted from price changes [CW, July 6].

Don't Make The Same Mistake



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Justice to Appeal CSC Fraud Suit Dismissal

Washington Update

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Justice Department has decided to appeal a federal court dismissal of its fraud suit against Computer Sciences Corp. (CSC) relating to the firm's bidding and billing for a large federal DP services contract.

The appeal to the federal appeals court in Richmond, Va., will ask that the original 57-count indictment against CSC be reinstated in district court in Alexandria, Va., for trial, according to Federal Prosecutor William L. Lynch.

The indictment, delivered by a federal grand jury last October, charged CSC, five present and former company employees and an independent consultant with racketeering, bribery and fraud in obtaining and servicing the estimated $100 million Infonet teleprocessing contract with the General Services Administration, awarded in 1972 [CW, Oct. 20].

Acting on pretrial defense motions, District Court Judge Richard L. Williams threw out all counts in two separate rulings earlier this year [CW, March 2]. Williams said the government failed to present sufficient evidence to support charges under a number of counts and failed to follow proper grand jury procedures.

Following the government appeal, expected by the end of last week, Lynch said that defense briefs and oral arguments will stretch the appeal process at least into October.

House Unit Fails In DOD Curbs

WASHINGTON, D.C. — A House of Representatives committee's fight to rein in the DP procurement authority of the Department of Defense (DOD) was beaten down recently by an administration and Congress eager to reform DOD acquisition practices before proposed large defense spending increases.

At issue was whether DOD should be exempted from the Brooks Act, the 1965 law giving the General Services Administration (GSA) procurement authority over all government DP equipment and services.

The Senate's pending DOD authorization bill would grant that exemption, although the House version does not specifically address the topic. To counter the Senate proposal, House Government Operations Committee Chairman Jack Brooks (D-Texas), for whom the 1965 law is named, sought to amend the House bill to reaffirm the law's applicability to all government agencies, including the Defense Department.

Brook's amendment was easily voted down, with a number of congressmen arguing GSA procurement regulations and oversight have so complicated DP acquisitions that many government general-purpose computer systems are obsolete and new ones take years to bring on-line.

Opponents of the Brooks amendment also claimed DOD secrecy requirements and the need to quickly upgrade military technology make GSA oversight a danger to national security.

Brooks countered that DOD officials just want to do "what they cotton-well please" and submitted testimony from a recent hearing in which the Office of Management and Budget (OMB) and the Defense Department blamed mismanagement, not the Brooks Act regulations, for the lengthy and burdensome procurement systems [CW, June 15].

Brooks said the DOD arguments against his amendment were "not based on any factual data, but rather on an intensive desire by the Department of Defense to first, avoid the competitive procurement process; and second, avoid further oversight by OMB and by the GSA, which in the past has highlighted [DOD's] many costly system failures."

Review Asked On AT&T Rate

WASHINGTON, D.C. — Two congressmen have asked the Federal Communications Commission (FCC) to reconsider the 12.75% rate of return the commission recently authorized for AT&T.

Immediately after it was allowed, the phone company asked for a 16% increase in private-line and MTS (dial-up telephone) rates, a 10.5% hike in Wats charges and a 35% reduction in overseas voice telephone rates — all of which became effective last month.

The congressmen — Ronald M. Mottle (D-Ohio) and Edward J. Markey (D-Mass.) — are members of the House communications subcommittee. They pointed out that the FCC awarded a higher rate of return than was recommended by the administrative law judge in his preliminary decision.

Another unbiased participant in the proceedings — the separated FCC trial staff — also recommended a lower rate of return than was granted by the commission, the legislators added.

Other parties filing comments in the proceeding, officially Docket 79-63, said the FCC's authorization of an "excessive" rate of return would encourage the states to follow suit and would also motivate Bell's competitors to raise their rates.

AT&T, commenting on the latter objection, said "keeping [Bell's] rate of return at an unfairly low level is no way to promote fair competition between AT&T and other carriers, who are also subject to increased costs, including the cost of capital."

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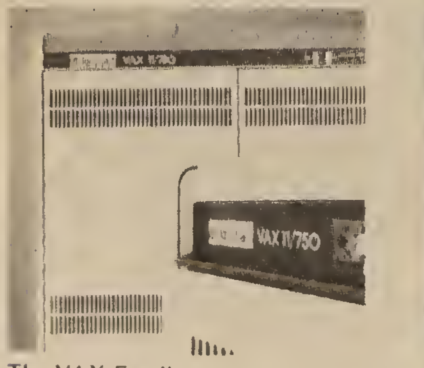

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In Florida Auditor's Report

Arthur Andersen Software Draws Fire

By Bruce Hoard
CW Staff

TALLAHASSEE, Fla. — The State of Florida's Office of the Auditor General has released a report in which $2.5 million worth of software systems installed by Arthur Andersen Co. is subject to severe criticism by at least one state offical and another Big Eight accounting firm.

When the auditor's office conducted an investigation of the systems at Shands Teaching Hospital here on June 30, 1980, it found the hospital's finances deep in arrears. "After implementation of the Patient Accounting System (PAS), from July 1978 to January 1979, cash collections were more than $5.5 million less than projected," the report noted.

Andersen did consulting work at Shands between June 1976 and July 1979. In addition to the PAS, the firm also installed a Financial Reporting System (FRS). At the time, Shands was a state hospital run by the University of Florida.

Firm Blamed

At least one hospital official blamed Arthur Andersen for outright failure to live up to the terms of its contract. A spokesman for the firm contended it fulfilled its responsibilities. At this point, the state is considering legal action.

According to a section of the report authored by Paul Metts, the software systems at Shands, powered by an Amdahl Corp. 470V/6 mainframe running under OS/MVT, did not live up to specifications.

Metts, vice-president for administration at Shands, said the state took over operations there in January of 1979, six months before Andersen left entirely. He came on board during an extensive management transition in 1977. The FRS was being implemented at approximately the same time, and the PAS package had progressed through the design stage. It was implemented the following June 1978.

Metts said he held a meeting with Andersen employees in charge of the project about a month later, on July 21. The Andersen people assured him all was well. Subsequent meetings were held to discuss increasing problems; the only result was "name calling" from the Andersen people, he claimed.

The Auditor General's office was eventually called in to completely audit the system, a task it confessed was too large and sophisticated for its abilities.

After the state took over the controversial systems in January 1979, Coopers and Lybrand, another Big Eight accounting firm, was called in to assess the systems.

Coopers and Lybrand declared the PAS did not represent "the current state of the art and requires substantial manual intervention," the Auditor General's report said. In addition, the firm criticized the IBM Health Care System (HCS) software package being used by Andersen, citing its billing and proration function, control capabilities, field sizes, data editing and management reporting capability.

Randal Thomas, a partner in Andersen's consulting division, worked closely with development of the systems. Addressing himself to the cash collection deficit of $5.5 million mentioned in the Auditor General's report, he admitted that "cash did fall off" during that period, but "most of it was caught up, I believe in the next six months," he said.

According to the report, the cash collection shortfall was effectively halved, to $2,470,000, during that period.

Regarding the criticism of IBM's Health Care System hospital accounting package, the consultant said he was not aware the hospital was unhappy with the package, which was selected "as part of a formal evaluation process that was a joint effort of Shands and Arthur Andersen Co."

Thomas said he has heard nothing about any law suits and, "quite frankly, I can't fathom on what basis there would be one." There were also no name calling incidents that he could remember, as claimed by Metts.

Andersen worked with Shands during a "follow-up period" between January and July 1979, Thomas said. "We wrote them a formal wrap-up memorandum and we received a very positive confirmation back from them stating they had accepted everything," he declared.

How-To Report Covers Copyrights

BELMONT, Calif. — Sofprotex, a division of Government Copyright Services, has released a how-to report focusing on copyright protection and computer software.

The report is aimed at preventing software copyright infringements, according to a company spokesman.

The report normally costs $25, but can be purchased for $20 by ordering directly from the publisher at P.O. Box 271, Belmont, Calif. 94002.

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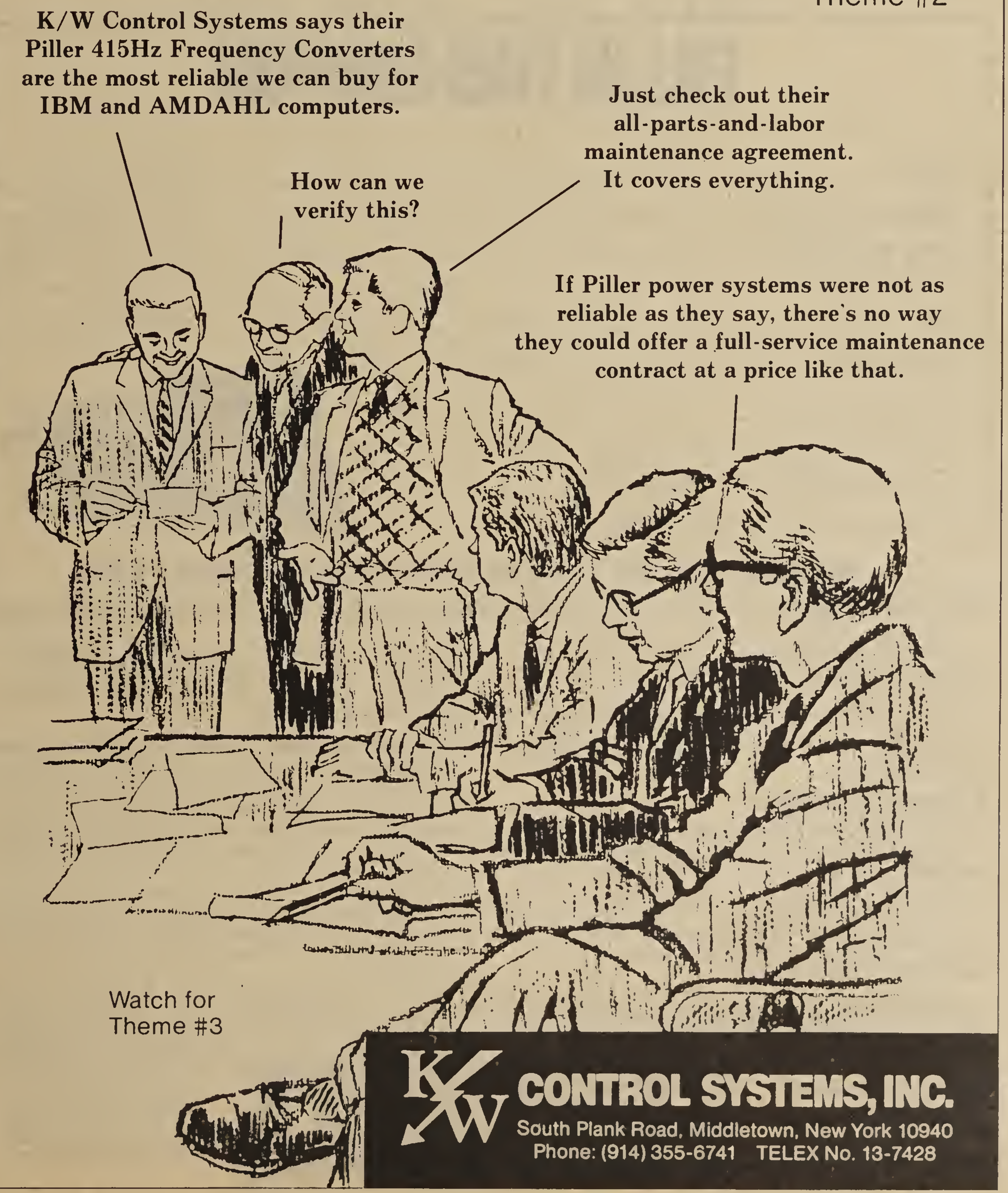
Theme #2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New Orleans Handgun Law Stirs Controversy

By Bill Laberis
CW Staff

NEW ORLEANS — This city, the most murder-prone in America, has passed its first month under a controversial computer-assisted handgun control law.

"It's a darn good law, one we are optimistic will have some positive effect on violent crime here," New Orleans Deputy Police Chief Warren Woodfork said.

But the parishwide ordinance, aiming to insure that felons convicted of violent crimes cannot purchase a handgun, is opposed by local gun dealers, who claim compliance with the law will drive away business.

"Computer or no computer, it's a damn stupid law, and I don't see where it's going to do a single thing to stop criminals from getting their hands on guns," Emmett Bellande, manager of The Gunshop, Inc., said here. "Where they're [criminals] concerned, no gun law is really going to work, because crooks don't buy guns."

Whether the law is a good one or a poor one, the reasons for it are self-evident. According to a recent report in *Time* magazine, this city of 650,000 has the highest murder rate in the country (a finding that police here contest).

The gun ordinance, approved by the city council last month despite a concerted gun dealers' lobbying effort, requires all handgun purchases be verified with several police department data bases, Woodfork explained.

When Purchasing Guns

While a prospective handgun customer is filling out the required federal government registration papers, the dealer must phone the police department, supplying the biographical information of his customer.

The police then feed this information into one of their Digital Equipment Corp. PDP-11/70s or into the city's IBM 370, where the information is checked against three data bases: the National Crime Information Center's file in Washington, D.C., the Lousiana Criminal Justice Information System in Baton Rouge and the department's own local data base of criminal information.

"All we are checking for is to see that the person wanting to buy the gun is not a felon convicted of a violent crime or a wanted man, because it is against federal law for such a person to buy a handgun," Woodfork said. "And the only information we give out is whether or not it is OK to sell the gun. The federal Privacy and Security Act prevents us from saying anything else."

Police and dealers both say the computer check procedure takes a few minutes at most.

That the law is preventing some convicted felons and fugitives from getting handguns, at least through legal means, appears to be borne out by police records compiled to date.

Since the June 16 inception date, 35 people have been refused handgun purchases. This figure includes 21 convicted felons, one man who had a charge of attempted murder pending against him and six individuals with outstanding warrants pending against them. The police will dispatch a cruiser to the gun shop where a wanted person is trying to buy a gun, usually arresting him on the spot, police said.

In this same one-month period, dealers gained approval to sell 440 handguns. Capt. Wayne Levet of the Records and Identification Division said between 8,000 and 10,000 handguns are sold annually here.

"The law is working very well, even if it only gets the gun out of a criminal's hand temporarily," Levet said. "If he wants a gun because he's mad at someone, he has to steal it or go to the next parish to get it. By that time, maybe he's cooled off some. We're not denying the ordinary citizen," he added. "People have the right to bear arms, like the Constitution says."

The dealers, however, see the situation quite in reverse.

"There's no way that a felon is going to walk in off the street and buy a gun from us — he's going to steal the damn thing, and probably not have a hard time doing it," a salesman at the X-Ring gun shop said. "It's just a big hassle, and I don't see anything good to come of it."

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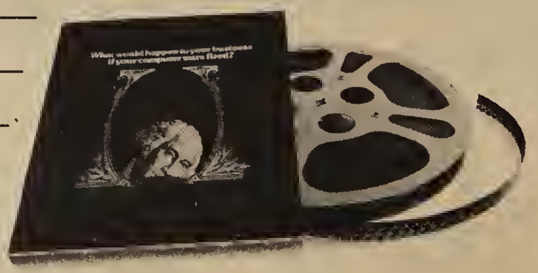

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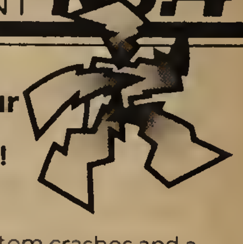

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DPers Told: Communicate With Senior Management

By **Brad Schultz**
CW New York Bureau

NEW YORK — From 1962 until a few years ago, management consultant John K. McKenna Jr. tried to hire senior managers willing to understand DP. Now he tries to hire DPers willing to understand management.

"There is no excuse for people in our profession to talk to senior managers in anything other than a language they can understand," he told a recent meeting here of the Association for Women in Computing. "If we want to be successful, we have to learn what is the language of senior managers."

McKenna is vice-president of The Presidents Association, a consulting company concerned with management of DP and management information systems. About a year ago, he asked 20 chief executive officers whether their jobs could be filled by the person in charge of DP at their companies. Only two of the 18 who responded to the survey said yes.

The other 16 chief executive officers said the person running DP at their companies could not "speak English," McKenna told Women in Computing. That meant senior managers viewed DP managers as specialists in technology, unqualified for higher positions, he explained.

This situation suggests that DPers with excellent communications skills have great advantages over other DPers in competing for promotions. That is good news for women, McKenna maintained, because women tend to be better communicators than men in most commercial organizations.

Anyone aspiring to management positions should understand, he said, that the art of management is getting others to do things, not doing things yourself.

In preparing for the future, DP managers should view the information that flows through their systems as a critical corporate asset, as important as money or people in ensuring successful attainment of corporate objectives, McKenna concluded.

Software Expo Set Sept. 15-17

CHICAGO — The "Windy City" will host the second annual Software Info Exposition on Sept. 15-17.

The event, sponsored by *Infosystems* magazine and produced by Professional Exposition Management Co., will showcase developments in packaged software.

More than 200 packaged software producers will be on hand to display their computer systems and applications, which will include forecasting/estimating, insurance, specialized programs and telecommunications. Software Info will include a full conference schedule devoted to packaged software applications and systems.

Admission to the exposition portion of Software Info is free to software users, but there is a fee for conference sessions. Further details are available from Professional Exposition Management Co., Suite 400, 222 W. Adams St., Chicago, Ill. 60606.

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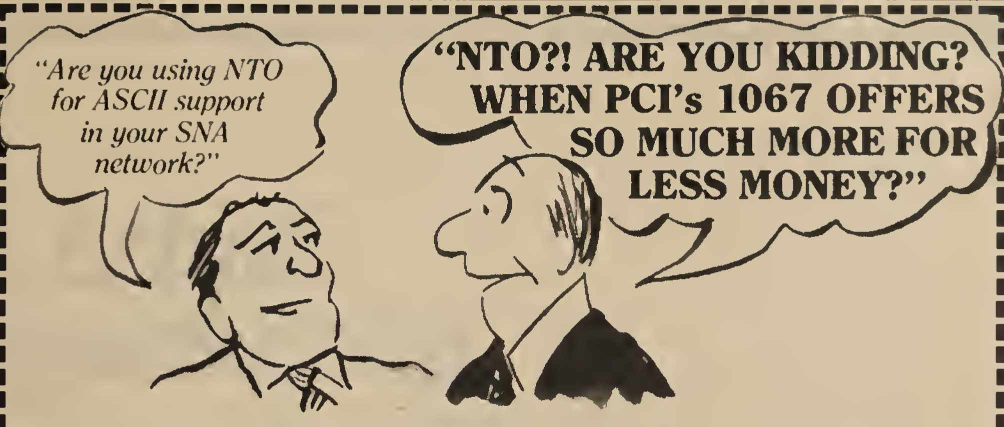
SAN JOSE, Calif. — Communications Solutions, Inc. (CSI) will conduct a three-day seminar Aug. 24-26 to provide data communications professionals with the information required to understand IBM's Systems Network Architecture (SNA), design SNA networks and evaluate SNA-compatible products.

Entitled "SNA Architecture and Implementation," the seminar will be led by CSI cofounders Steve Randesi and Don Czubek.

The registration fee of $650 includes all course materials, refreshments and lunches, the vendor said from CSI at Suite 200, 4040 Moorpark Ave., San Jose, Calif. 95117.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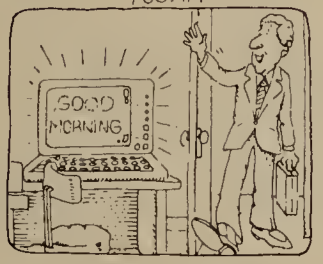

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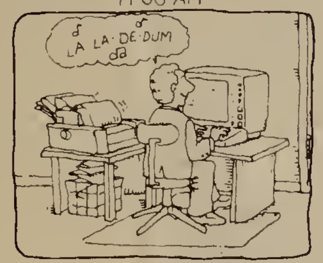

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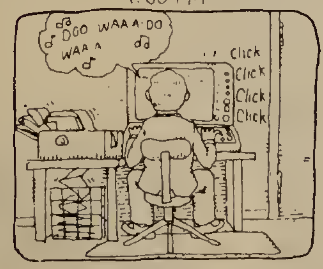

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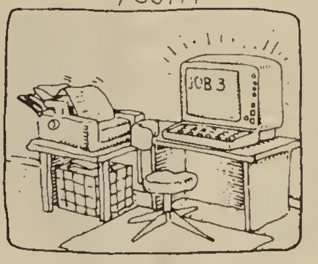

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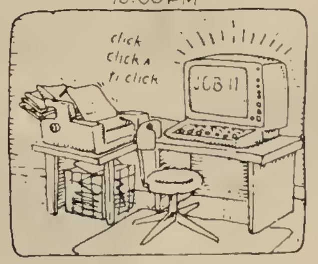
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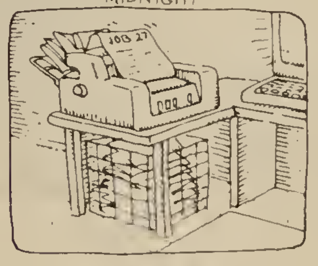

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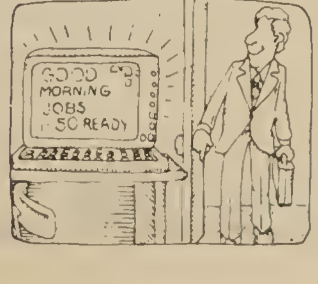

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Nasa Plans to Wipe Out Ten Years' Accumulation Of Nondigitized Tapes

By Tom Henkel
CW Staff

WASHINGTON, D.C. — The National Aeronautics and Space Administration (Nasa) wants to erase thousands of satellite-transmitted tapes that have never been digitized for computer use because, it said, no one wants them.

Moreover, the tapes are so old — some are pushing 10 years — that the data is no longer reliable.

Most of the satellite tapes are part of a land surveillance project known as Landsat. Nasa has been accumulating data from the past three Landsat satellites, the first of which was launched in 1972.

Ten Years of Data

From 10 years worth of data, Nasa has gleaned pictures and digitized versions of every land mass in the world, much of it showing views of the land masses in each of the four seasons. Those tapes are available to anyone who wants them for the cost of processing, according to Jim Eliott, head of Nasa's Eastern Region Remote Sensing Center.

The most frequent users of the satellite tapes are the oil exploration and mining industries, Eliott explained. For them, the vital information does not change that much in 10 years and the single shots of each land mass are probably sufficient.

Other users of the data, such as researchers who analyze the world's crop output, can also make use of the 10-year data. However, Nasa says if they have lived without it this long, they probably do not need it.

Another problem with the the undigitized data is that much of it is marred by cloud cover. In other words, the Landsat satellite took pictures of the tops of clouds rather than of land masses. While portions of those tapes are usable, Nasa and the civilian users of the data do not feel it is worth processing, Eliott said.

The older Landsat data can be saved by rerecording it onto newer tapes, but there are still problems with processing it. The early Landsat tapes were designed to be processed on a specially designed processor made up of Bendix Corp., RCA, Inc. and GTE, Inc. hardware. That system was built in 1970-1971 and has since been replaced with a specially designed IBM processor. Therefore, the older software must be converted to run on the IBM processor, according to the project's data processing manager, Mark Selig.

Seasat Data

Unlike the Landsat project, a complementary satellite dubbed Seasat, launched to evaluate the water masses of the world, has managed to process all of its data. Seasat, launched in 1978, was destroyed in a massive electrical burnout after 99 days of transmission.

It took the Seasat project two years to process all the satellite tapes on an IBM 360/75, but most of that time was spent developing the algorithims to do the actual processing.

Data from both the Landsat and Seasat projects is available from the Nasa Aeros Data Center in Sioux Falls, S.D. 57102.

Four-Color ATC System Debuts At U.S. Navy Control Center

By Tim Scannell
CW Staff

JACKSONVILLE, Fla. — A four-color air traffic control (ATC) system that uses different colors and color intensities to display aircraft and other related data has been installed here at the U.S. Navy's Fleet Area Control and Surveillance Facility (Facsfac).

Designed by Sanders Associates, Inc., a New Hampshire-based company, the computer-controlled system reportedly marks the nation's first use of color graphics for air traffic control.

Although the current system is part of a $6 million Naval contract, the system's use, and the use of color in general, is being explored for commercial applications by the Federal Aviation Administration (FAA) under a number of developmental contracts taken out with Sanders and another firm last year.

Digitized Radar

Dubbed with the military moniker AN/FYK-17 (V), the system differs from current commercial displays in that it uses colors and relies on digitized rather than beam-sweep radar data. Unlike present monochrome ATC systems, the Sanders display allows weather and aircraft data and schedule information to be segmented by color, a spokesman explained.

Zoom Feature

The system also displays areas ranging from four to 512 nautical miles, can zoom in on a specific airspace area, and can draw or display up to five computer-stored maps.

Because of their radar techniques, present commercial and government beam-sweep systems are not capable of performing all of these functions, the spokesman noted.

Geared for real-time control, the Sanders system incorporates software that allows controllers to coordinate Naval missions, conduct search and rescue activities and provide navigation advisories to both aircraft and seagoing ships.

It can also accept and use data from traditional FAA and Air Force radars and the Navy's Tactical Data System.

As part of its Naval contract, Sanders is also building a 12-station color system at the Navy's Virginia Capes site and a 16-display ATC unit in San Diego. In addition, a system will eventually be installed at the Navy's base in Hawaii, the spokesman said.

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*
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*
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In Blue-Ribbon Panel Report

NSF Warned DP Ed in Need of Federal Rescue

By Brad Schultz
CW New York Bureau

SEATTLE — A blue-ribbon team of scientists, educators and industry notables has told the National Science Foundation (NSF) that only the federal government can save American universities and colleges from failing to train computer professionals and professionals who compute.

The team included the chancellor of the University of Wisconsin at Madison, Digital Equipment Corp.'s vice-president for engineering, the president of SRI International, the provost of Carnegie-Mellon University and the president of Control Data Corp.'s subsidiary venture in educational systems. Among those advising the team was Dartmouth College's Thomas Kurtz, a co-developer of Basic.

In higher education, this "consensus panel" noted in a report written under an NSF grant here at the University of Washington that computing is a subject of study; a tool for students, researchers and administrators; and an instruction aid. The panel termed the explosive growth of academic computing an "accidental revolution" that overwhelms most American universities and colleges while other nations rise to the occasion.

The panel's report calls on the National Science Board to:

- Identify policy issues for Congress and federal agencies.
- Inform the public about these issues.
- Stimulate curriculum development in computing.
- Expand research programs.
- Develop standards for computing in higher education.

The National Science Board should also identify "new strategies for human resource development, particularly to ensure the equality of opportunity," the report told NSF. As for Congress, the report recommended that federal lawmakers:

- Fund programs that improve computing in higher education.
- Establish "coordinated national information policies."
- Enact tax laws and impose regulations to encourage industry to share computing resources and even collaborate in research with educational institutions and encourage such sharing and collaboration among educational institutions.
- Recognize computing as "an essential national need" and computing in higher education as a "national resource."

The so-called consensus panel of scientists, educators and industry figures also advised that the federal government's executive branch should loosen constraints on education and research and strengthen policies that promote computing.

Fastest Growing Segment

According to the panel, the fastest growing segment of computing in higher education is neither instruction nor research, but administration. Thus, upgrades of computer facilities at many universities and colleges have not helped teachers and researchers nearly so much as the institution's operations and financial personnel.

Other countries, especially Japan and France, have launched vigorous national programs to educate people in computing and to encourage computer science research, the panel reported. But the U.S. has allowed its annual output of graduates in academic computing programs to fall well below demand for computing professionals, NSF was told.

The report cited a study that found 54,000 job openings in the U.S. available to bachelor's degree graduates in computing, but only 13,000 people had just become eligible to take them.

This study found only 3,400 new holders of master's degrees in computing, but 34,000 job openings at that level. Just 330 holders of new doctorates in computing were discovered for 1,300 vacancies.

The report declared "information activities (both direct and indirect)" account for more than 46% of the nation's gross national product. More than half of America's labor income goes to information workers, the report added.

Other reports have estimated more than 600 faculty positions in computer science are vacant in American universities and colleges while students sign up for computing classes in record numbers — not just computer science or data processing majors, but also majors in disciplines that now make training in computing a requirement for graduation.

At this rate, several computer science chairmen have told *Computerworld*, many students who want to study computing will be denied that opportunity.

More information on the report is available from Robert G. Gillespie, vice-provost for computing at the University of Washington in Seattle.

Not the First Warning

The National Science Foundation (NSF) is well aware that America is losing its capacity to fill the demand for college-level education in computing. Two years ago, the Association for Computing Machinery (ACM) published in its *Communications* a report to NSF that blamed the migration of computer scientists from academia to industry on widening salary differentials and obsolescence of campus computing facilities [CW, Sept. 17, 1979].

In another report, this one summarizing a consensus reached at last year's annual gathering of U.S. and Canadian computer science department chairmen, ACM President Peter J. Denning said of this migration, "We are killing the goose that laid the golden eggs."

Moreover, the dwindling reserve of people able to hatch the next generation of computing specialists has led to many conversations between NSF — a major source of research funds in academic computer science — and worried university officials, especially since the Reagan administration announced plans to cut NSF appropriations.

NSF last year awarded nearly $5 million to researchers at the University of Wisconsin at Madison for development of a data communications network that would allow computer scientists and students at poorly equipped schools remote access to the facilities of well-equipped schools.

Neims Elects Long As New Chairman

STURBRIDGE, Mass. — Edward Long, a data base consultant with New England Life Insurance Co., has been elected chairman of the New England IMS User's Group (Neims). Long succeeds Paul Larkin of American Optical.

Robert Piehl of American Optical has been named vice-chairman of Neims.

The group holds its meetings here on the third Tuesday of every month, September through June. The next meeting will be held Sept. 15, when the focus will be "Logical Design," featuring Dick Perkinson of QED Information Sciences, Inc.

Installations holding a current license for any release of IMS may send representatives. There is an annual fee of $25 for each installation and a $10 fee for each meeting covers lunch and refreshments.

Additional information on Neims is available from the new chairman at 25 Primrose St., Roslindale, Mass. 02131.

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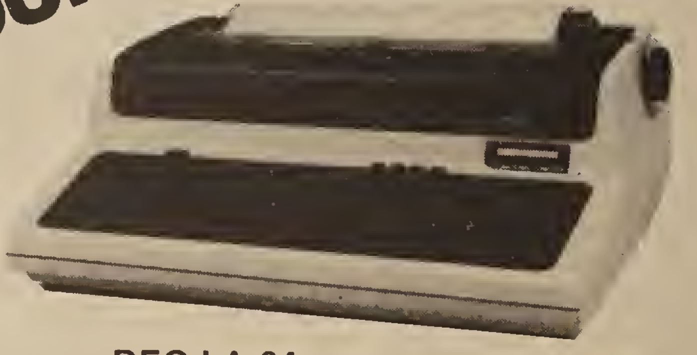

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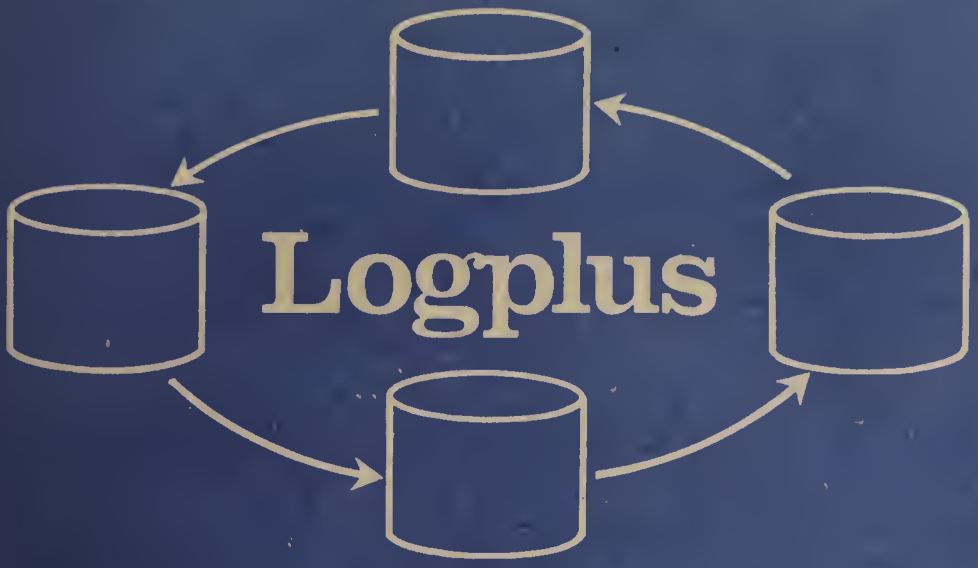

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Managers on the Move

ROBERT J. JIROUT has been appointed vice-president of information systems and telecommunications at the Chicago Board of Trade (CBT). Jirout will be responsible for the design, programming and maintenance of all trading floor support computer systems, the exchange's computerized accounting and member services systems and all telecommunications systems including TV, voice and data.

He will also be in charge of planning and implementing computer and telecommunications systems for the trading floor of the CBT's 23-story addition, currently under construction.

Jirout first joined the exchange as director of information systems and telecommunications in February 1979. Prior to that he was director of information systems at Swift, Inc. and also worked as DP director for the city of Chicago in the mayor's Cabinet.

Jirout received a master's degree in business administration from Loyola University and a bachelor's degree in biology from St. Ambrose College.

•••

WILLIAM K. WILSON has been promoted to vice-president of systems for Dorset/SGI, an in-house credit union data processing systems company headquartered in Livingston, N.J.

Wilson has 12 years of experience in the DP field and has done hospital accounting as well as credit union data processing.

Wilson, who gained his formal education at a technical school in Princeton, N.J., has taught courses on structuring Digital Equipment Corp. PDP-11 computers at Villanova University in Philadelphia and has written and designed synchronous communications protocols for DEC products.

•••

Don Coolen

Robert J. Jirout

LESLIE W. SCOTT has been elected vice-president of management information systems for Knudsen Corp. in Los Angeles.

Scott joined Knudsen in November 1979 as director of management information systems. Prior to that he worked in data processing for both Kaiser Steel Corp. and Baker International Corp.

A graduate of the University of Kentucky, Scott holds a bachelor of science degree in business administration.

•••

JOHN M. GRANGER has been promoted to director of the Information Systems Division of Stop & Shop, Inc. in Boston.

In his new position, Granger will be responsible for all corporate information systems activities including data base management, corporate development, computer operations, production control, technical support and financial control. His previous post at Stop & Shop was data center manager, a position he occupied for two years.

Granger holds a management science degree from Richland College in Dallas and attended the IBM Systems Science Institute.

•••

DAN COOLEN has been promoted to director of data processing at Marshall's, Inc., the retail operation based in Woburn, Mass.

Formerly Marshall's systems and programming manager, Coolen will report directly to the vice-president of management and information systems.

Coolen, a graduate of Northeastern University, joined Marshall's in May 1980.

•••

Paul Goldak

PAUL GOLDAK has been appointed director of data processing at Rexall Drug Co. in St. Louis, Mo. Goldak will assume responsibility for the company's corporate data processing function, including computer operations, application systems development and corporate DP strategic planning.

During his 13 years in the DP field, Goldak has worked as a programmer, programming supervisor, systems manager and senior consultant. Most recently, he was manager of systems and programming at Mallinckrodt, Inc. Goldak's educational background includes a bachelor of arts degree from Southwest Missouri State University and a master's degree in business administration from St. Louis University.

•••

JAMES L. PELLEGRINO has joined Avco Lycoming Stratford Division as vice-president of information systems and services.

Pellegrino was director of information systems at Sikorsky Aircraft for eight years prior to assuming his newly created post at Avco. His previous experience at United Technologies included assignments at the Hamilton Standard Division as manager of business systems programming and computer operations.

Pellegrino has lectured widely for IBM at various executive management institutes and manufacturing seminars and for the Data Processing Management Association.

Pellegrino served four years in the U.S. Air Force, with the rank of first lieutenant. He holds a bachelor's degree from the University of Connecticut. Pellegrino's civic activities include serving as city councilman of Meriden, Conn., director of the Meriden Economic Development Corp. and president of the Central Connecticut Chapter of the U. Conn. Alumni Association.

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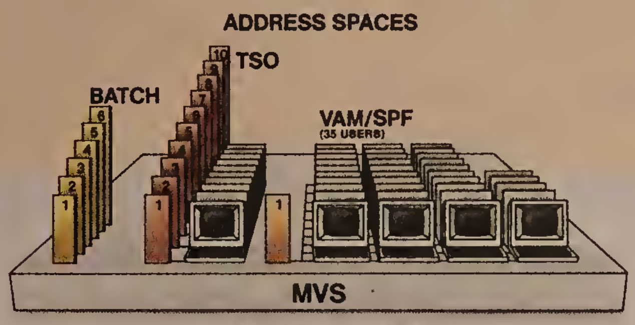

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Scenario for Disaster?

End User Goes Data Base Without Programmer

By Rita Shoor
CW Staff

HAUPPAUGE, N.Y. — What happens when an end user meets a data base management system (DBMS) and there's not a programmer in sight?

Some would call it a scenario that spells disaster. But when Dave Wirenius, associate public health engineer for the Suffolk County Department of Health, met Intel Corp.'s System 2000 DBMS, the result was a data base system designed and utilized sans programmer.

"It will never be necessary for me to hire a programmer," said Wirenius, whose entire previous programming experience is limited to one three-credit Fortran course he took in 1967. The public health sanitarian who works for him had about the same amount of experience.

However, bolstered by a one-week course administered by Intel, he has had no problem utilizing System 2000. Interface to the vendor's Programming Language Extension (Plex) "covers everything I could possibly want," he said.

Suffolk County's first exposure to System 2000 was through Control Data Corp.'s Cybernet remote computing service, which the county used to monitor its water supply by maintaining a relatively small data base of information on wells. But the cost of using Cybernet to develop data bases on the county's public and private wells would have been "prohibitive," Wirenius said.

So Wirenius and his cohorts went shopping at the 1979 National Computer Conference in New York. At the time "we didn't realize we could buy it [System 2000] separately."

However, when they discovered the DBMS was available as a separate software product, it was purchased with part of a $200,000 grant provided by the state Department of Health. The permanent software license was about $75,000 with the cost split between Suffolk and Nassau Counties because "we convinced Nassau County it would work for them . . . and we are bringing them into the system this month," he said.

Loading the data bases on a Sperry Univac 1100/80 computer at the University of Stonybrook began in January 1980. Twenty data bases with information on approximately 1500 public wells and more than 10,000 wells in the private sector are already up.

The schema for all types of wells is identical and the system can "provide anyone with any data they want on water quality," Wirenius maintained. Although still mainly involved with "loading information rather than generating reports," 15 reports are currently prepared on a regular basis.

Golden Gate U. Offers Courses

SAN FRANCISCO — Golden Gate University will offer three undergraduate courses and 15 graduate seminars in telecommunications management during the fall semester beginning Sept. 8.

The programs will be conducted on the main campus in San Francisco, as well as in Cupertino, Sunnyvale and Los Angeles.

Course fees range from $225 to $372. Registration opens Aug. 13. Additional information is available from Golden Gate University, Admissions Office, 536 Mission St., San Francisco, Calif. 94105.

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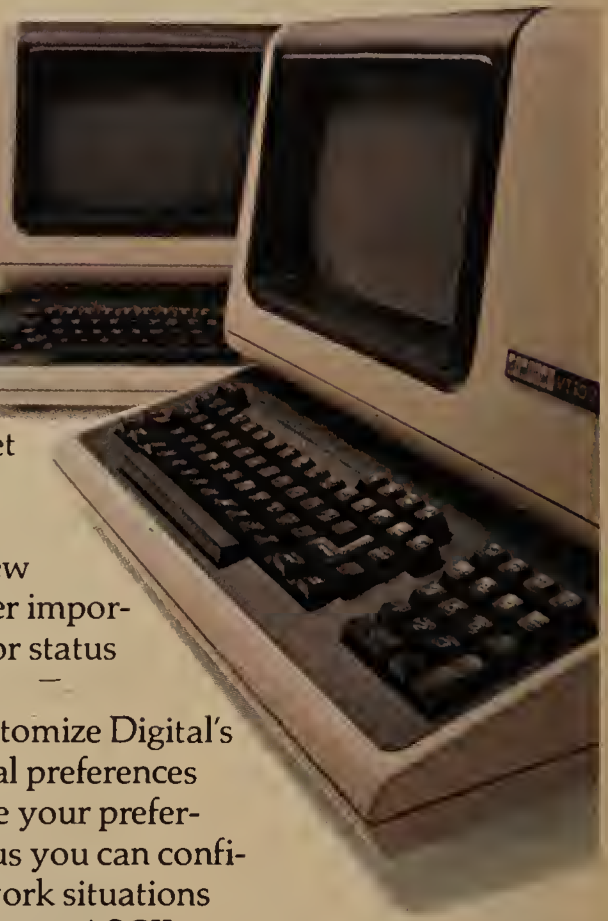

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Overcomes Professional Isolation

Security Specialists Form Group

By Jeffry Beeler
CW West Coast Bureau

No specialty within the information systems field suffers more from professional isolation than the computer security sector. Unlike most programmers and systems analysts, who are accustomed to working with others of their own kind, full-time security specialists usually account for no more than one job slot in the typical corporate computing staff.

Most such specialists, therefore, seldom get an opportunity to meet their professional fellows face to face and "talk shop" about common interests and problems.

To compensate for the computer security field's dearth of professional communication, a small band of Northern California systems experts has come together to form a new users association known as the Bay Area Computer Security Interest Group (Bacsig).

As its name suggests, Bacsig caters exclusively to computer security managers who work within a one- to two-hour drive of San Francisco. Since its founding more than 18 months ago, the group has grown to about 30 members and today represents some two dozen large Bay Area-based financial institutions, manufacturing companies, universities and government agencies.

Every six weeks or so, the members meet in a different location to hear a prepared discussion of a relevant, preannounced topic and to talk informally about security related matters ranging from auditing to disaster recovery planning, from software protection safeguards to privacy and computer abuse.

The intent behind Bacsig's frequent, periodic meetings is to give members an opportunity to develop lasting professional contacts and to provide computer security managers with a vehicle for sharing information and advice about common interests and problems, according to one of the group's cofounders, Doug DeVries.

The potential benefits of this information sharing are many. In addition to disseminating little known tricks of the trade, the interplay of ideas helps Bacsig members keep abreast of state of the art technological developments, take advantage of each others' professional experiences and, ultimately, improve the quality of their companies' information and systems security, DeVries said.

In a sense, Bacsig provides its members with a substitute for the informal information exchange that most other business and technical specialists take for granted, but which computer security managers find difficult, if not impossible, to duplicate on the job.

Formed in December 1979, Bacsig owes its existence to two Bay Area computer security managers — DeVries and his colleague Steve Johnson, who work for Hewlett-Packard Co. and Pacific Telephone Co., respectively.

At first, the cofounders spent most of their time defining their brainchild's primary mission and testing the waters to see if the group could command enough of a following to justify its continued existence.

Since then, DeVries and his colleagues have satisfied themselves that Bacsig indeed addresses a demonstrated industry need. So now, for the first time in its history, the group is finally beginning to launch an all-out campaign to significantly expand its membership, DeVries said.

Although Bacsig plans to limit its membership drive to the immediate Bay Area, the group may eventually have a much wider impact by serving as a prototype for similar organizations elsewhere in the U.S., the HP computer security manager said.

More information about the group is available from Doug DeVries at Hewlett-Packard, 3000 Hanover St., Bldg. 20-CH, Palo Alto, Calif. 94304.

Microdata Users To Meet

NEW YORK — Micru International, an association of Microdata computer users, will hold its 1981 Summer Conference here Aug. 3-5.

The keynote speaker will be Lawrence Feidelman, president of Management Information Corp.

Other featured speakers include Leon Jaroff, managing editor of *Discovery* magazine, and Lt. Robert Young of the New York Police Department.

The educational program will feature more than two dozen seminars and workshops.

More information on the conference is available from Micru International, 4300-L Lincoln Ave., Rolling Meadows, Ill. 60008.

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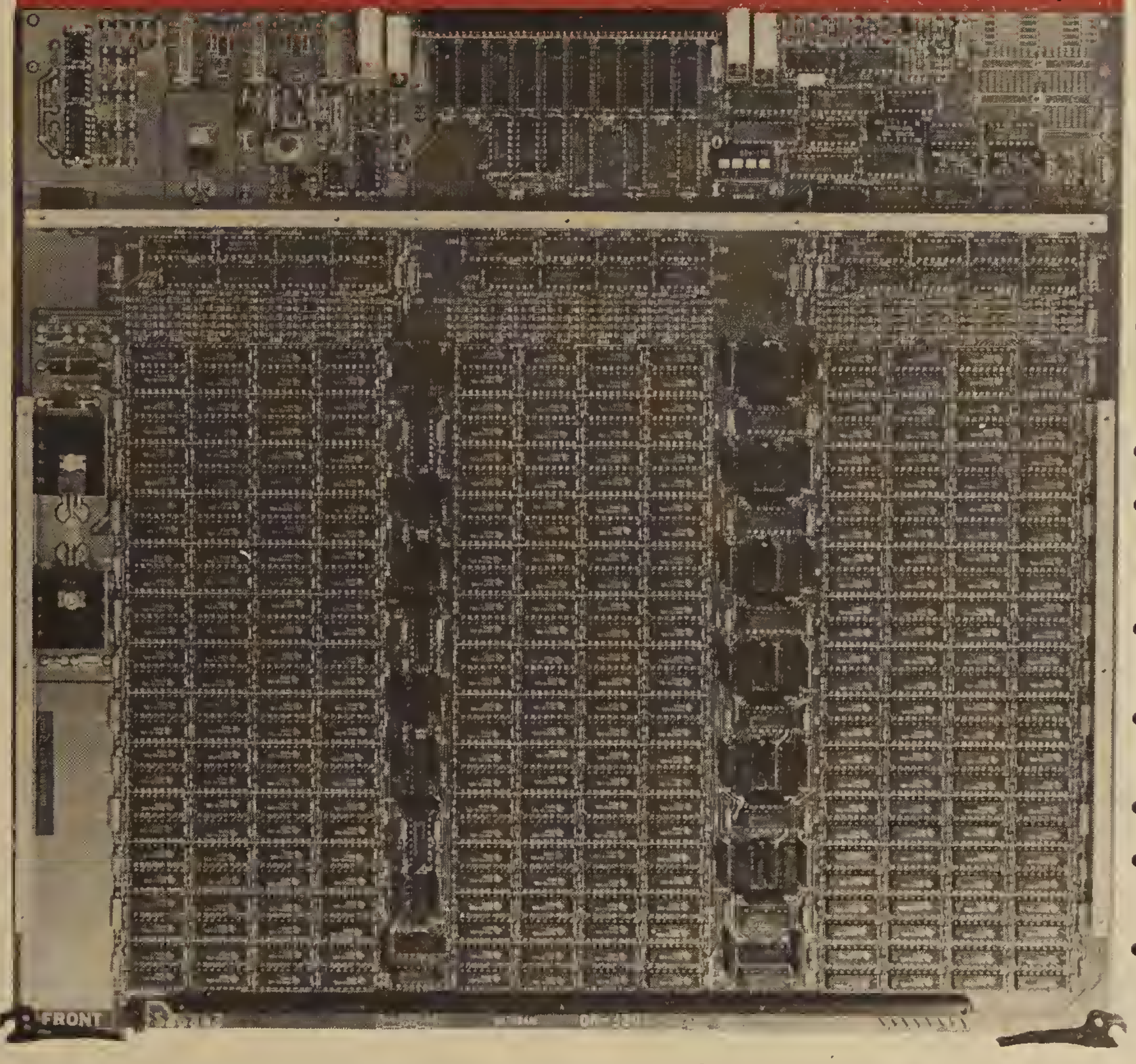

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The DR-320S continues the Dataram tradition of providing Perkin-Elmer compatible products at the industry's lowest cost/bit. Products that are not only compatible, but which offer additional features.

For example, the 512KB DR-320S, which occupies only one slot, offers twice the memory capacity of the comparable 256KB Storage Module (Model 35-694) available from Perkin-Elmer. The DR-320S operates in conjunction with the Perkin-Elmer Memory Interface Board contained in the host 3200 Series minicomputer.

The DR-320S is internally configured as a 128K x 39 bit (32 data + 7 ECC) memory to provide the 512KB capacity. A 256KB version of the DR-320S is also available. The DR-320S employs 16K RAMs having a 150 nsec access time to meet the speed requirements of the 3200 Series minicomputer. Tri-state receivers and drivers are used to transfer data between the DR-320S and the memory interface board.

In addition to 3200 series memory products, Dataram also offers core memory modules for older Perkin-Elmer/Interdata machines as well as BULK MEMORY Disk Emulation Systems for the full family of Perkin-Elmer minicomputers.

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Service Reputation a Plus

Datasystem 355's Reliability Scores With Users

By Hillel Segal
Special to CW

Not a barn burner in the speed department, Digital Equipment Corp.'s Datasystem 355 nevertheless scored high with users, who emphasized the equipment's reliability and the company's reputation for service and support.

Software compatibility all the way up and down the line, from DEC's smallest PDP-11 system to the 32-bit VAX-11/780, was also seen as a plus. In addition, customers liked the availability of compatible non-DEC peripherals, often at lower cost.

The 355 is the fifth system in the $25,000 to $50,000 range the Association of Computer Users (ACU) has reported on for *Computerworld*. ACU's independent consultants used for their tests a Datasystem 355 configuration consisting of a PDP-11/34A central processor, 256K bytes of main memory, 10.4M bytes of hard-disk storage, an 8-line multiplexer, a VT100 console terminal and an LA180 line printer.

The price of this system was $43,550, with each additional terminal costing about $2,000.

SCOREBOX

System: DEC Datasystem 355
Current Price: $43,550 with one terminal
$57,900 with eight terminals

OTHER BENCHMARK RESULTS
Test E-4

	CPU-Intensive (Run in Background) **Time**	Order Entry Response Time (Eight Terminals Simultaneously) **Time**
Wang 2200MVP	16.4 Sec	4.6 Sec
IBM Series/1	*	*
TI DS990 Model 4	135.2 sec.**	4.3 sec.**
Hewlett-Packard 250	***	***
DEC Datasystem 355	84.1 sec.	16.1 sec.
Alpha Micro AM-100T	To be covered in future issue	

* Programs could not be run properly due to a loss of characters in the order-entry processing.

** For programs run in Cobol; the respective times for Pascal are 68.1 sec. and 3.9 sec.

*** The 8-terminal test could not be run, as a maximum of 5 terminals can be connected. With 4 terminals, times were 47.6 seconds for the CPU test, and 2.3 seconds for the Order Entry test.

Terminal Slowdown

As can be seen in the Scorebox, the 355 was somewhat slower than systems already tested. The test programs were written in DEC's Dibol-11, sort of a cross between Cobol and Fortran. One interesting outcome of the speed tests was a noticeable slowdown when additional terminals were added.

In the CPU-intensive test, for example, the 355 was almost twice as fast with only two terminals attached. In the order entry tests, the difference was even more pronounced — with only two terminals connected, the time was 7.5 sec (as opposed to 16.1 sec with eight terminals connected).

This is a considerably greater degradation in speed than we have seen in other systems tested so far. It is particularly surprising because each terminal was allocated its own piece of main memory. Usually, this is a much faster method than swapping programs in and out of main memory.

DEC offers two operating systems for the Datasystem 355. CTS300 supports the Dibol-11 programming language and provides multiuser, multiterminal capabilities (up to eight terminals).

For an additional $13,800, you can upgrade your system with the CTS500 operating system. In addition to Dibol, CTS500 supports Cobol, Fortran and Basic. CTS500 also offers more advanced time-sharing capabilities (up to 16 terminals), more file management utilities and more disk storage capability.

This is the 33rd in a series of articles giving the highlights of benchmark tests conducted on popular, small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

Both CTS300 and CTS500 use a standard line-oriented approach (as opposed to a menu-driven approach). Commands are entered interactively, line by line.

However, you can shortcut this process by building indirect command files that allow you to invoke a whole set of system commands by issuing a single, one-word command.

Multiterminal capability is made possible by the use of dynamic partitioning, whereby each terminal is allocated its own chunk of main memory. The operating system also supports an overlay feature that allows subroutines to be brought into main memory and "layed over" the existing code.

Of the 13 Datasystem 355 users whom we interviewed, almost all were using Dibol in one capacity or another. Dibol combines the data definition features of Cobol with the procedural statements of Fortran. Because of its similarity to both of these languages, Dibol is easy to learn and looks familiar even to programmers who have never seen it before.

Most of the Dibol users we contacted were very pleased with the language, particularly with its being upwardly compatible within the DEC PDP-11 line. The only negative comments dealt with Dibol's nonportability — it is not generally available on non-DEC equipment.

In addition to Dibol, CTS300 supports a number of utilities including a text editor, a sort/merge program, a linker, a library maintenance utility and Decform, a compiler that processes screen format directives and generates Dibol source code.

Most users we spoke with were quite satisfied with CTS300. A few sour comments came from users who had been using their systems long enough to remember Version 4, a system notorious for its innumerable bugs. However, Versions 5 and 6 have been received well.

The PDP-11/34A is a member of a large family of PDP-11 processors, ranging from microcomputers to medium-scale computers. All these processors share a common architecture, which means that programs written on any one of them will run on all of them.

The PDP-11/34A comes with 128K bytes of central memory, but add-on memory in 32K- or 128K-byte blocks can be purchased. In addition, DEC offers a 2K-byte high-speed random-access memory.

This cache memory can save a lot of processing time, particularly when executing repetitive programs. When the processor fetches locations from main memory, the contents of these locations are placed in the cache. When the processor calls these locations again, the cache memory registers a "hit" and sends the information to the processor. This saves the processor the task of fetching the same information from main memory again and again.

DEC estimates that with certain applications, the cache memory can increase processing speed by as much as 60%.

Secondary Storage

In the area of secondary storage, DEC offers a large number of possible configurations. Eight drives can be attached with either 5.2-, 10.4-, or 28M bytes of storage capacity each. With the CTS500 operating system, 67- and 176M-byte drives are available. However, many of the users we contacted were using non-DEC hard disk systems.

DEC offers a full range of I/O devices including printers, hard-copy terminals, video display terminals and a card reader. Although DEC's printers and terminals are among the best in the field, many users opted for non-DEC devices due to substantial cost savings.

As one user put it: "There's lots of peripherals available to hang onto DEC equipment."

As might be expected from a company that has been around as long as DEC, customer support services are very strong. In addition to its direct aid, DEC also supports Decus, the DEC user's group. The firm's equipment maintenance was especially singled out for praise.

Hillel Segal is president of the Association of Computer Users, a nonprofit association with members in the U.S., Canada and several other foreign countries. A package of information about the Association of Computer Users is available from the group at P.O. Box 9003, Boulder, Colo. 80301.

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Used by Behavioral Psychologist

Software Goes Behind Bars in Five States

By Lois Paul
CW Staff

ATLANTA — A behavioral psychologist here is using computer technology to help five state prison systems manage themselves and classify their inmates.

"When this first began in Colorado and I built the first classification program based on the records that we had, I found the state to be running at better than 87% exceptions to its own rules," Dr. Herbert Eber of Psychological Resource said.

"With 87% exceptions, you don't need any rules," he added.

Eber cited as an example a rule that says an inmate who has escaped in the last year must be kept in maximum custody. More frequently, he said, this custody involves "an inmate who has done nothing more than eat and sleep and go to the bathroom and work for four years.

"It doesn't make much sense to classify someone as being maximum custody because of escape risk if in five years as a prisoner he has never made the slighest move to escape," he added, "particularly when that costs the taxpayers about 25 grand a year to keep him, as opposed to keep him for perhaps half of that at a less secure institution."

Using Eber's management software package, which he calls Visor, "Alabama is currently hovering around 85% compliance with their own rules and shooting for 90."

Escape Rate Down

He claimed his psychological classification work has contributed to the drop in the escape rate from Georgia prisons, which is less than half what it was when the program began.

"It also dropped for other reasons. Other good things were happening, too. But then some of these things stopped happening and became different and the rate stayed down," Eber said.

He primarily uses Data General Corp. equipment in his work and employs DG Nova 2, Nova 4 and two DG 1200 minicomputer systems, which each have 64K bytes of memory. Disk storage consists of some DG 6098 drives with 12½M bytes of memory and a floppy disk backup.

The software is written by Eber in Algol, with some sections in Assembler.

The major part of his work consists of psychological assessment using computers on every incoming inmate in Alabama, Georgia, Colorado, Arizona and Oklahoma's state prison systems.

Each inmate is tested and the results are run through computer programs written by Eber and then emerge in narrative reports with specific recommendations that can be used by prison officials, treatment people and judges.

In Colorado, Arizona and Alabama, Eber helps manage local institutions by keeping adequate behavioral records of what the inmates have done in the past, he said.

"Every state has spent a fairly substantial amount of money on a set of programs and hardware called the Offender Base State Criminal Information System," Eber said.

This consists of large mainframes at the state headquarters and terminals at local sites.

The system works at some things, he said, "the things large mainframes do well, such as communications with other large mainframes [and] feeding the sheriff's network of who is wanted for what."

He continued, "Quite often they work rather well in statistical data gathering for headquarters except for the fact that many of the data elements are garbage."

Eber said that many of the people out in the field refuse to feed a large computer system honest information and admitted that this problem is not unique in this business.

"In most of the organizations I know, the data at headquarters bears little relation to what actually happens out in the field," he said.

Eber's Visor management program is designed to avoid this situation wherein data at headquarters is behind and inaccurate.

"What we've done is placed minis in the institutions out in the field and had them feed information of value directly to the people who are really managing the system — [like] the guards [and] the wardens," he said.

The users get a form that includes the relevant current status and what that status should be according to their rules.

"If the judgment is not what it should be by the manual, it asks them to justify their specific exception. That goes back into the system," he explained, noting that the machine accepts the justification for a certain period of time and then kicks it back out again.

He said Alabama is the only state using his management program in a centralized manner.

In his psychological classification work, Eber receives data at his office or the data is processed at a DG minicomputer he installed at the site.

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CICS Documentation System Keeps Shipping Firm Afloat

NEW YORK — When Barber Blue Sea put its fleet of supercarriers into service, its agent in North America, Barber Steamship Lines (BSSL), was faced with the task of developing a computerized documentation system that operates in the CICS environment to keep the fleet moving at optimum speed.

Development of this system and application of throughput were speeded by use of Central Software, a system development tool from Planning Research Corp. (PRC).

Speed was essential in development and system use because keeping up with the supercarriers was not easy, the spokesman continued. The six roll-on/roll-off (RO/RO) cargo ships, purchased at a total cost of $200 million, reportedly can load or unload in less than a day, making calls at 24 ports on a round-the-world voyage of fewer than 80 days.

Self-Contained Centers

The supercarriers function as self-contained, cargo-handling centers, able to accommodate any type of cargo — including up to 1,800 containers, 400 automobiles and quantities of breakbulk, self-propelled cargo and heavy-lift machinery.

Recognizing the challenge involved in the system development, Nancy Cohen, BSSL's management information systems (MIS) assistant vice-president, explored the possibility of using Central Software with its vendor, PRC. Cohen found the development tool most valuable for the accurate worldwide documentation essential for running a steamship line.

Central Software captures information at the port of load and consolidates and distributes it for local, national and overseas use. It provides accounts receivable, accounts payable and marketing information, as well as cargo documentation that aids in managing discharge of the ship and clearing customs.

The bill of lading is the primary input to the system and includes all cargo information, such as who is shipping what to whom, how the cargo is packaged and customs and other regulations that must be met. More than 100 data elements in the bill of lading must be gathered, organized and dispersed in a readable format prior to the ship's reaching the port of discharge.

Before initiating the on-line system, BSSL documentation procedures involved considerable clerical detail and handling with the opportunity for introducing error, Cohen said. Cargo manifests had to be typed and organized, copies made and sent overseas and copies collected in the New York office for batch processing.

The on-line interactive system enables all edits to be made immediately. "Now we have accurate data all the time," Cohen said.

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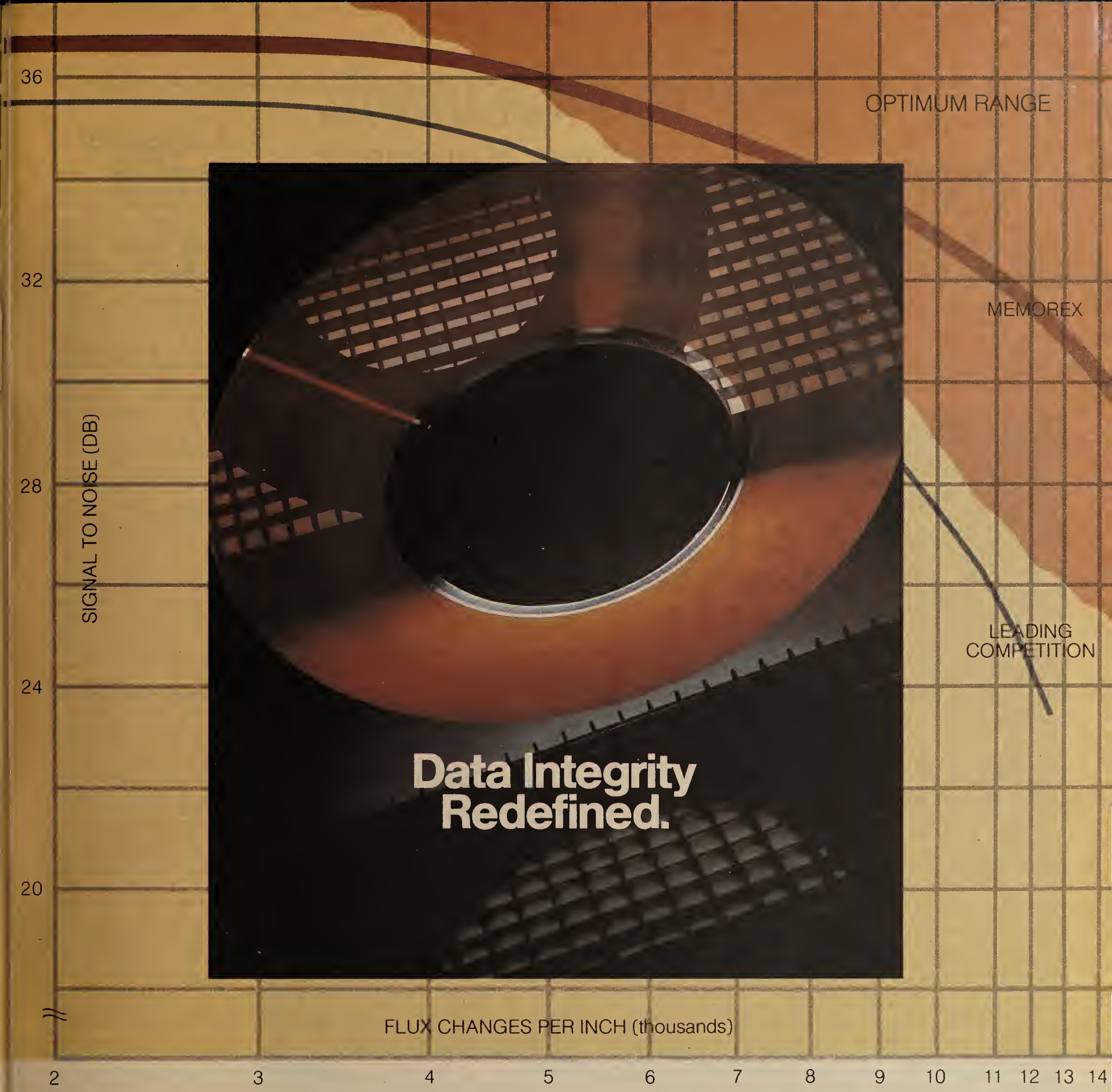

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The seminars will be held in Chicago, Oct. 5-6; Boston, Oct. 20-21; New York, Oct. 22-23; Cherry Hill, N.J., Oct. 29-30; and San Francisco, Nov. 5-6. All enrollees may also participate in a writing improvement program.

The registration fee for the two-day seminar and the six-month coaching program is $545. More information is available from the American Institute for Professional Education, Carnegie Bldg., Madison, N.J. 07940.

DEC Program to Cover Software Management

BEDFORD, Mass. — "Software Project Management: A Systematic Approach" is a seminar being offered by the Digital Equipment Corp. Education Service.

The two-day program will be conducted in Houston, Aug. 10-11; Boston, Sept. 17-18; Washington, D.C., Oct. 19-20; Seattle, Nov. 12-13; and again in Boston, Dec. 10-11.

The program will examine the full spectrum of project considerations including application time development, application lifetime, software and hardware costs and understanding project requirements.

The registration fee is $545 from DEC Education Services, Seminar Programs, 12 Crosby Drive, BU/E58, Bedford, Mass. 01730.

Calendar

Aug. 6, Pittsburgh — **Stradis — Management Overview of Structured Systems Development Methodology.** Contact: George Blatt, Department K227, Box 516, St. Louis, Mo. 63166. Also being held Aug. 17 in Seattle, Aug. 18 in Portland, Aug. 19 in San Francisco, Aug. 21 in Dallas, Aug. 24 in Chicago, Aug. 26 in Philadelphia and Aug. 28 in Morris Town, N.J.

Aug. 10-14, San Francisco — **Auditing Structured Analysis & Design Workshop.** Contact: Anthony Formica, Yourdon Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Aug. 17-21, Boston — **Structured Design Workshop.** Contact: Anthony Formica, Yourdon Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Aug. 17-20, Boston — **Strategic Planning for Data Processing.** Contact: Alloway, Inc., Registration Center, 8th Floor, 50 Staniford St., Boston, Mass. 02114.

Aug. 17-19, Chicago — **Improving Automated Payroll Systems.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

Aug. 18-19, Chicago — **How to Select Computer Terminals.** Contact: Albert Jefferson, CRC Systems, Inc., 4020 Williamsburg Center, Fairfax, Va. 22032. Also being held Aug. 25-26 in Boston.

Aug. 24-28, Boston — **Project Design for DP Applications.** Contact: Alloway, Inc., Registration Center, 8th Floor, 50 Staniford St., Boston, Mass. 02114.

Aug. 24-25, Asheville, N.C. — **IRM — Putting It All Together.** Contact: Information Resources Management Associates, Inc., Box 40795, Washington, D.C. 20016.

Aug. 26-28, Washington, D.C. — **Evaluating and Selecting Automated Office Systems.** Contact: Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

Aug. 31-Sept. 2, Boston — **Managing the Maintenance of Programs and Systems Workshop.** Contact: Dr. Ned Chapin, Infosci, Inc., Box 7117, Menlo Park, Calif. 94025.

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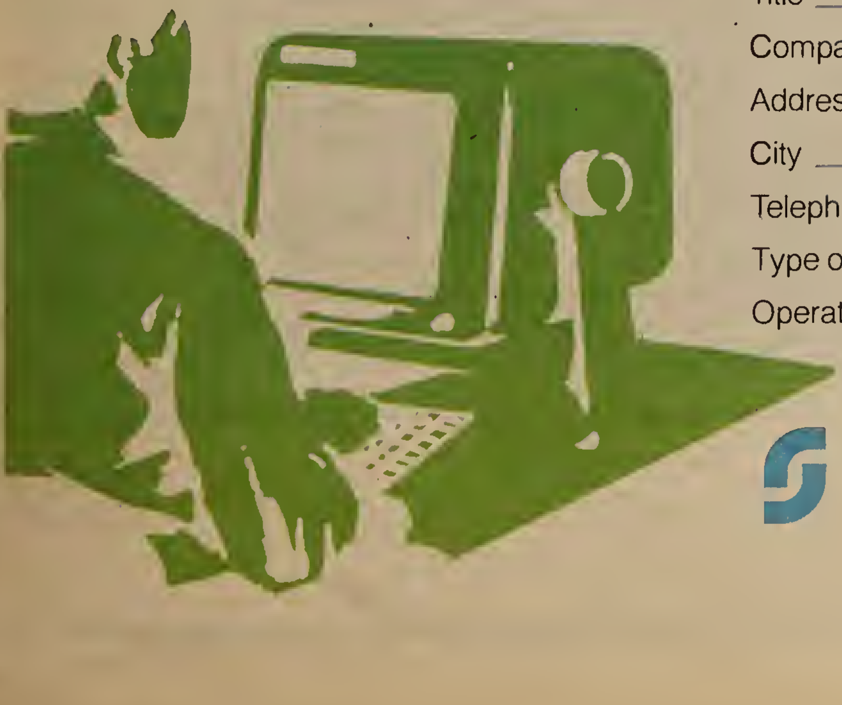

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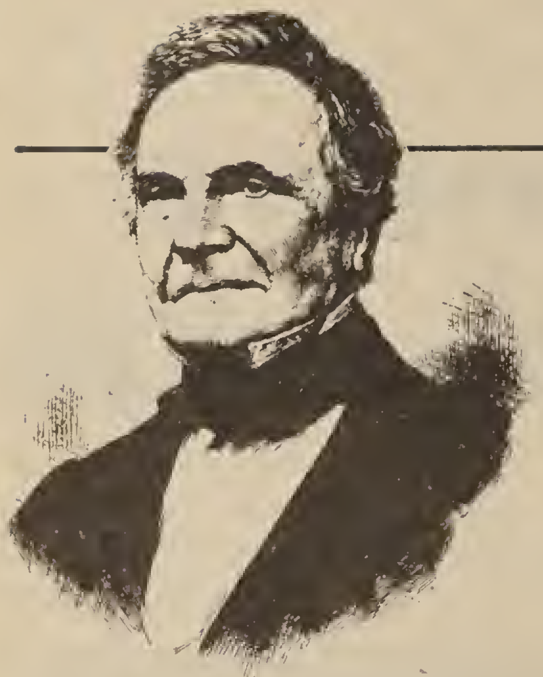

Courtesy of Charles Babbage Institute

May you never again claim to feel frustration after reading the story of Charles Babbage, a man before his time who spent most of his life in the vain attempt to manufacture a machine considered by most of his contemporaries to be utterly ridiculous.

In thousands of detailed drawings made 150 years ago, Babbage projected the fundamentals on which today's computers operate, but his ideas met almost universally with a veil of ignorance and nonunderstanding. If the technology of the 19th century had been equal to Babbage's genius, a computer would have been built in 1822.

But the technology was not there, and Babbage was destined to see the fruits of his labor only on paper and in theory. More than a century later, however, Howard Aiken, director of Harvard University's Mark I computer project, remarked, "If Babbage had lived 75 years later, I would have been out of a job. The historic Mark I, completed in 1944, was conceptually very like Babbage's machine.

Charles Babbage was born on December 26, 1791, in Totnes, Devonshire, England, into the fascinating and tumultuous epoch of the French Revolution. He was one of two surviving children of Benjamin Babbage, a banker, and Betty Plumleigh Teape, both of Totnes and both descended from well-known Devonshire families.

As a child, Charles Babbage displayed a great inquisitiveness into the causes of mechanical workings. Upon receiving a new toy, he reportedly would ask, "Mamma, what is inside of it?" If the forthcoming answer was not to his satisfaction, the child would proceed to take the object apart to satisfy his curiosity.

Besides things mechanical, Charles nurtured an early interest in the occult. While still a child, he once attempted to prove the existence of the devil by drawing on an attic floor a circle in his own blood while reciting the Lord's Prayer backward.

With no conclusive results from that experiment, his interest in the supernatural continued. Charles arranged with a boyhood friend that whoever died first would appear to the survivor. When his friend died at the age of 18, Charles stayed awake all night awaiting the apparition that never came. Even in his college years, Charles formed a ghost club to collect reliable evidence supporting the existence of the supernatural.

After a classical education at an old and venerated boys' grammer school, Charles entered Trinity College, Cambridge. There he continued his record of boyish pranks and rebellion that resulted largely from the boredom of one who often knew more than his instructors.

Despite his unorthodox behavior, Charles was well on his way to absorbing the advanced theories of mathematics. With several others, he formed an Analytical Society to present and discuss original papers on mathematics and to interest people in translating into English the works of several foreign mathematicians.

Seed Is Planted

At Cambridge, Charles' studies led him to a critical examination of the logarithmic tables then used to make accurate calculations. He was well aware of the difficulty and tediousness of compiling the astronomical and nautical tables that were indispensable to the great maritime nation, and was constantly finding and reporting errors in existing tables.

During a free moment, Charles was contemplating a problem while sitting in a room of the Analytical Society. Upon seeing Charles apparently in some far-off world, a friend asked him the nature of his dream. It is told that Charles pointed to some logarithmic tables and said, "I am thinking that all these tables might be calculated by machinery."

The idea took firm hold in Charles' mind, and after graduation he returned home to begin sketching a machine by which all mathematical tables could be computed by one uniform process. He became convinced it was technically feasible to construct a machine to compute by successive differences and even to print tables when they were computed, thereby avoiding the then-numerous compositors' errors. It is noteworthy that Babbage's ambitious venture was undertaken 50 years before typesetting machines or typewriters were invented.

While still formulating the plans for his machine, Babbage at 23 married 22-year-old Georgiana Whitmore, exactly one year before the 1815 Battle of Waterloo. Georgiana was to have eight children in 13 years, only three sons of whom survived to maturity. Four sons died in infancy or childhood and their only daughter died in her late teens.

It is said Babbage took almost no interest in the upbringing of his children and instead retired to his library for hours at a time, concentrating on technical problems in a manner approaching obsession. When Georgiana died at 35, Babbage's own mother assumed the complete care of the children, from whom Babbage chose to live completely apart. He was not to remarry in his 80-year lifetime.

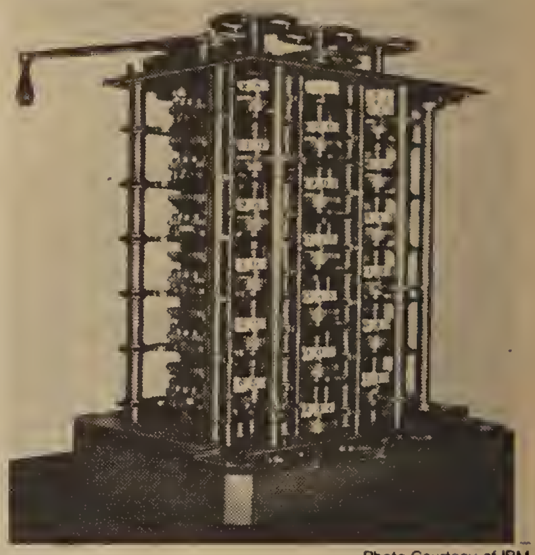

Photo Courtesy of IBM

Babbage's Difference Engine as Reconstructed From His Writings

Two years after his marriage, in 1816, Babbage had his first taste of worldly failure, followed closely by his second taste. His application for the professorship of mathematics at East India College in Haileybury was rejected because of political reasons, as was his application, three years later, for the chair of mathematics at the University of Edinburgh, glitter-

Earl of Stanhope Laid Foundation for Babbage's

The foundation for Charles Babbage's calculating engine was an arithmetic machine developed in 1777 by an eccentric, well-born politico named Charles Mahon, Third Earl of Stanhope.

Mahon's grandfather was a commander in the War of the Spanish Succession and Prime Minister of King George I (the same George I who failed to invite Gottfried Leibniz to England when he acceded to the throne), and his grandmother was the daughter of Governor Pitt. Mahon's father devoted most of his life to science and became a prominent intellectual rather than a member of politics and society.

Born in London on August 3, 1753, Charles Mahon was the only surviving child of his parents. At the age of nine, he was sent to Eton School, where he displayed strong indications of his mechanical and mathematical interests.

In his 19th year he was sent to Geneva, Switzerland, and placed under the tutelage of the celebrated French jurist and writer Alain Rene Le Sage. Applying himself to geometry, mechanics and philosophy, Mahon soon won a prize offered by the Swedish Academy for the best essay written on the construction of the pendulum. At 19, he was elected a fellow of the Royal Society.

Married at 24 to his second cousin, Lady Hester Pitt, Mahon that same year invented two calculating arithmetic machines. The first, "by means of dial-plates and small indices, moveable with a steel pin, performed with undeviating accuracy" complicated sums of addition and subtraction.

The second solved problems in multiplication and division "without the possibility of mistake" by the revolution of a small winch. It was half the size of a common table writing-desk, and "what appears very singular and surprising to every spectator to this machine is that in working division, if the operator be

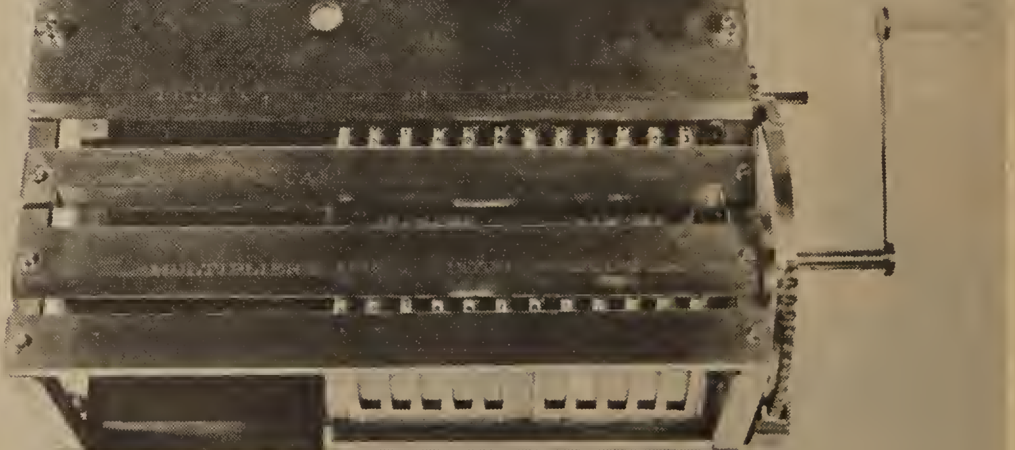

Photo Courtesy of IBM

One of Charles Mahon's Early Calculating Machines

Part 3 . . .

Charles Babbage: Man Before His Time

By Marguerite Zientara
CW Writer/Analyst

ing recommendations notwithstanding.

Fortunately, the elder Babbage gracefully supported Charles and family, while he continued his feverish work on calculating machines. By the time he was 30, Babbage was ready to announce to the Royal Astronomical Society that he had embarked on the construction of a table-calculating machine.

His paper, "Observations on the Application of Machinery to the Computation of Mathematical Tables" was received with wide acclaim and Babbage was presented the first gold medal awarded by the Astronomical Society.

Appeals to Royal Society

Now determined to similarly impress the prestigious Royal Society, Babbage wrote a letter to its president, Sir Humphrey Davy, stating that the "intolerable labour and fatiguing monotony" of a continued repetition of similar mathematical calculations had first excited his desire and afterwards suggested the idea of a machine that "by the aid of gravity or any other moving power" should become a substitute for one of the "lowest occupations of the human intellect."

A 12-man committee considered Babbage's appeal for funds to complete his project and in May 1823 the Society agreed that the cause was worthy. In July, Babbage received £1,500 "to enable him to bring his invention to perfection in the manner recommended."

In developing his Difference Engine, as Babbage called it, Babbage studied the mathematical inventions of several predecessors, notably the work of Charles Mahon, Third Earl of Stanhope (see related story). While he drew heavily on Stanhope's principles, what distinguished Babbage's design from all previous work was this:

That it proposed to calculate a series of numbers following any law by the aid of differences, and that by setting a few figures at the outset, a long series of numbers was readily produced by a mechanical operation.

Besides the gradually apparent implementation problems connected with the Difference Engine, problems also arose from a misunderstanding between Babbage and the British Government, both of whom regarded the machine as the property of the other. The misunderstanding, which caused various problems

(Continued on Page 34)

Engine

inattentive to his business and thereby attempts to turn the handle a single revolution more than he ought, he is instantly admonished of his error by the springing up of a small ivory ball."

Of great importance was Mahon's use of gear wheels and a 10s-carrying device. The machine contained a series of toothed wheels, having wide faces bearing 10 long teeth.

The first tooth, which reached completely across the face, represented nine, and the next tooth was one-ninth shorter, the next one-eighth shorter and so on down the line. To add nine, the toothed wheel was moved along so that the nine teeth would engage; to add eight, it was moved so eight would engage.

Champion of Common Man

A man of great versatility, three years after Mahon invented his arithmetic machines he became a member of the Lower House (in 1780), and in 1786 a peer in the House of Lords.

He was chairman of the Revolution Society, which sympathized with the French Revolution, and in 1795 he introduced in the House of Lords a

(Continued on Page 36)

Courtesy of Culver Pictures

Ada Lovelace

(Continued from Page 33)

for the next 20 years, at first delayed Babbage's work on the engine while he awaited further funds beyond the initial grant.

Finally begun, the engine endured many permutations, improvements and modifications over the next four years, each one setting progress back to Square One because of the need for specially created tools to construct the unheard-of parts of the machine.

Babbage apparently had miscalculated his task. Constructing the Difference Engine would have cost about 50 times the money he was given. Furthermore, he needed two tons of novel brass, steel and pewter clockwork, which had to be made since it was not then available.

In 1827, in the midst of Babbage's professional difficulties, he was overwhelmed by a series of personal tragedies: the deaths of his father, wife and two of his children. At the same time, rumors were beginning to circulate regarding the expense of the engine and questioning its value.

Photo Courtesy of IBM

George Scheutz's Calculator, Inspired by, But Different From, Babbage's

Babbage estimated he had already spent about £6,000 on the engine.

Events took their toll and Babbage fell ill. His family advised him to travel abroad for several months to regain his equilibrium. On his return, Babbage approached the Duke of Wellington, then prime minister, regarding the possibility of a further grant.

In the victor of Waterloo, Babbage found someone who could truly grasp the principles and capabilities of his machines, and the two remained friends for the rest of the duke's life. The British government shortly granted another £1,500 followed by £3,000 more, with a promise to furnish remunerative sums upon completion of the machine.

Babbage also had inherited £100,000 upon the death of his father — a sum from which he was often obliged to "borrow."

After fitful work on the Difference Engine, Babbage was faced with more problems, this time surrounding the chief engineer on the project, Joseph Clement, who demanded more and more exorbitant sums for work completed. The matter culminated in the engineer's quitting work on the engine and firing all his workmen.

In the midst of his considerable troubles, Babbage turned his attention to other things, running unsuccessfully for Parliament and publishing numerous technical works, including his *Economy of Manufactures* (1832), now considered a pioneer work on operational research. The main theme was the division of labor, applied to mental as well as mechanical operations.

The Analytical Engine

While deprived of his tools and drawings by Clement, Babbage was struck by yet another brainstorm — he would design a machine that would be easier to construct, have greater versatility and operate faster than the Difference Engine.

His new inspiration, the Analytical Engine, would go beyond the Difference Engine and perform all arithmetic calculations — as opposed to a limited set — and would combine such operations to solve any conceivable arithmetic problem.

The Analytical Engine included most of the essential features of today's digital computers, expressed in mechanical terms. The machine was to be divided into two parts: the "mill," in which arithmetic processes were carried out, and the "store," which contained the data to be worked on, as well as intermediate

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The store would consist of 1,000 registers, each containing a 50-digit number. Numbers could be selected from the store, operated upon and the result returned to another location in the store.

The control of the whole process was to be carried out through a set of punched cards similar to those used in the Jacquard weaving loom, invented in 1801 and still in use today. Jacquard looms allowed the weaving of elaborate patterns as easily as older looms made plain cloth, since the pattern of holes on each card — indicating the weaving design — was read by plungers that passed through them.

Babbage proposed to use the cards both to specify the operation to be carried out and to give the address of the operand in the store. He also envisioned using another set of cards, the number cards, to feed data into the machine, although it appears he expected the store registers to be set up by hand with the constants required.

An all-important feature of the Engine was its ability to make conditional jumps. Mechanical means were provided to allow a band of cards to be advanced or backed, thereby jumping some cards, or repeating them.

Enter Lady Lovelace

"We may say most aptly that the Analytical Engine weaves algebraical patterns just as the Jacquard-loom weaves flowers and leaves. Here, it seems to us, resides much more of originality than the Difference Engine can be fairly entitled to claim."

Those words were written by Lady Ada Augusta Lovelace, only legitimate offspring of the poet Lord Byron, and a woman who was to dedicate the last decade of her short life to interpreting Babbage's Analytical Engine.

Now considered the first "programmer," Lovelace, like Babbage, was way ahead of her time, insisting on pursuing major intellectual ideas in an age when women were expected to voice their thoughts through their husbands, if at all.

Dark, delicate and considered beautiful, Lovelace was 27 when she translated from French to English L.P. Menabrea's paper dealing with the Analytical Engine. A mathematical genius in her own right, Lovelace took Babbage's suggestion and added some notes to the paper, resulting ultimately in a work three times the length of the original manuscript.

By 1843, at age 28, Lovelace had mastered Babbage's plans for his engine and was as obsessed with the concept as he was. Having the good fortune to be married to a man who encouraged her intellectual progress, as well as one who could afford help in caring for their three children, Lovelace channeled most of her talent and energy to further Babbage's cause, eventually correcting some serious errors in his work.

One of her seminal ideas was that a large calculation might contain many repetitions of the same sequence of instructions, and she pointed out that by using the conditional jump facility, it should be possible to prepare only a single set of cards for the recurring instructions. She thus described what we now call a "loop" and a "subroutine."

Her ideas were extended a century later by the British mathematician Alan M. Turing in 1937 and by John von Neumann in 1946 — both of whom were instrumental in the development of the modern electronic digital computer.

The woman who possessed such vision and insight was to meet an excruciating end at the age of 36, from cancer, leaving Babbage once again alone to continue his unrewarding labors.

In all, Babbage was to spend 14 years and £17,000 on the Difference and Analytical Engines, neither of which would be built in his lifetime. Time and again, prestigious posts that had been promised him would escape his grasp, the British government would completely withdraw its financial support and, ultimately, the general feeling toward him and his machines was adverse.

Ironically, Babbage's dream was to be partially realized by a Swedish printer, George Scheutz, who built a

(Continued on Page 36)

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(Continued from Page 35)

similar, workable calculator after reading an article on the Difference Engine in the *Edinburgh Review* in 1834.

Scheutz and his son began work on the machine, designed for computing mortality tables, in 1837. Quite different in principle from Babbage's machine, Scheutz's Tabulating Machine was much smaller and consisted of four differences and 14 places of figures, but it could print tables.

To everyone's surprise, Charles Babbage did everything in his power to ensure the success of the new machine and was undoubtedly instrumental in its being awarded the French Gold Medal in 1855.

The first model was purchased for $5,000 in 1856 and sent to the Dudley Observatory in Albany, N.Y., and a duplicate was made for the British government and used in the registrar-general's department.

Babbage's gracefulness and cooperation are not so puzzling when one considers the following: his own machine had inspired Scheutz; Scheutz's was infinitely less ambitious than his own and therefore much easier to complete; and its very existence proved that a calculating machine of this type not only could be made, but could work.

Now in old age, Babbage at 71 agreed to have the completed section of his Difference Engine shown to the public for the first time. Presented at the Great Industrial Exhibition in London in 1862, the engine was finally shown, albeit "in a small hole, four feet, four inches in front by five-feet deep," as Babbage put it. It was surrounded by other exhibits and no more than six or seven people could examine it at any one time.

Babbage's many disappointments led him to say he had never had a happy day in his life, and one of his friends observed that he spoke as a man who "hated mankind in general, Englishmen in particular and the English government . . . most of all."

On October 18, 1871, two months short of his 80th birthday, Charles Babbage was close to death. "It's a long time coming," he said to a friend. "Now I am going, as they call it, to the other world: Ask me any question you like as to my feelings or thoughts, and I will tell you."

History does not record what questions or answers may have been given, but it does note that only a handful of mourners were at his burial six days later — proof that a man's greatness cannot be judged by the opinions of his contemporaries.

Stanhope Broke Ground

(Continued from Page 33)

motion denouncing any interference with France's internal affairs — a point on which he was, characteristically, a minority of one.

As a Whig (conservative), Mahon fought for parliamentary reform, abolition of slavery, freedom of the press and for the independence of jury courts.

Besides his arithmetic machines, Mahon developed what is considered to be the world's first logic machine, the "Stanhope Demonstrator." Not only could the device be used for solving traditional syllogisms by a method closely linked to the Venn circles, but it also handled numerical syllogisms as well as elementary problems of probability.

Inventive in areas other than mathematics, Mahon is credited with devising a scheme for fireproofing buildings, a method of roofing houses, a kiln for burning lime, a steamboat and a double inclined plane for improving the operation of canal locks.

He also evolved a plan for preventing forgeries in coin and bank notes, developed a monochord for tuning musical instruments, a microscopic lens and, in the realm of printing, he invented the stereotype printing press that bears his name.

Reportedly odd in his dress and person, Mahon was said to be completely unaffected in his manners — a remarkable trait in one of such high rank. The Earl of Stanhope died on December 15, 1816, deeply lamented by all, especially the humbler class of citizens for whom he had worked so hard.

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Report From 'Down Under'

EXIT THE DATA PROCESSOR: ENTER THE DATA CUSTODIAN

An Australian's perspective of the computer as a powerful tool for positive social change, and the computerist's responsibility as the keeper of that tool.

By Christopher L. Bagley

Technology can be defined broadly as "the body of information and skills and experience developed for the production and use of goods and services."[1] Normally, the ongoing development of technology within a society is an orderly process, involving the gradual incorporation of new products and techniques into the life of the community. At particular stages of history, however, evolution is suddenly compressed into revolution as a sudden burst of technological development introduces massive changes in the economic and social structure.

During the 1970s, a growing number of social commentators expressed the view that the "new technologies" — in particular, those developments related to computing and telecommunications — have introduced a period of intensive social change.

Their perspective has been presented most graphically by Alvin Toffler in his argument that we are now at the opening stages of a rapidly forming "third wave" of civilization (the previous two waves being agriculture and industrialization).[2]

Although Toffler's long-term scenario is optimistic, he would agree with other pundits who foresee social disruption on a large scale throughout the next few decades. The pessimists have compiled a daunting list of evils, including the following:

- Displacement of millions of workers from their jobs as national economies move from an industrial to an information base.
- Development of two-tiered societies: an upper level of technocrats with the expertise to direct the new processes; a lower level of economic "passengers," whose own range of once-employable skills can now be replicated within the superefficient machines.
- Burdens of dislocation to fall disproportionately upon women and young people.
- The material gap between rich and poor nations to widen to an insupportable extent because only the richer nations will be able to afford the educational base necessary to form a postindustrial society.
- Inevitable erosion of individual liberty because of the enhanced capacity of state and private bureacracies to collect and collate vast masses of personal information.

'Some of My Best Friends . . .'

Most of the Jeremiahs who hold such views are, fortunately, too polite to express their opinion of us, the computing professionals who are presumably the prime agents of the impending social havoc. However, it is reasonable to assume we are not held in high esteem. At best, we could be seen as ignorant technoholics, too dim-witted to assess effects that cannot be expressed neatly in our simple cost/benefit analyses. At worst, we might be characterized as selfish elitists, lacking any compassion for fellow humans whose lives are diminished by the new order.

Furthermore, it must often seem we fail abysmally to meet even our own standards of achievement. Many press reports suggest the computer revolution is being abominably mismanaged. For example:

- Australian pharmacists were overpaid by $250 million, simply because no officer in the responsible Health Department knew how to audit the results produced by a contract programmer.[3]
- In the first of a series of three computer-related mistakes, U.S. nuclear bombers were ordered to take off after a computer operator mounted the wrong magnetic tape on the Early Warning System.[4]
- Three Mile Island was the worst nuclear power plant accident in history because the warning messages emitted by the computerized environmental control system were not intelligible to the human operators.[5]
- Air safety. Computers in U.S. air traffic control centers break down more than 800 times annually. Control is so tenuous, it was alleged to the FBI, that an air traffic controller, upset by events in Iran, was able to play Russian roulette with a plane carrying the Soviet Ambassador, Anatoly Dobrynin. The controller allegedly lifted tracking from another terminal, then "instructed his computer to remove data about the airliner from his display. The Aeroflot, its pilot apparently unaware that his plane was no longer being tracked,

(Continued on Page 38)

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landed safely."[6]

- Computer-based fraud is acknowledged to be huge and growing, although its exact size is anybody's guess. Probably fewer than 20% of cases are reported to law enforcement agencies and the rate of successful prosecution is low. One exponent was Stanley Rifkin, who stole $10.2 million from the California bank that employed him as a computer security consultant. His original plan to plant "Trojan Horse" coding within the software proved unnecessary, because he was able to copy a crucial password from a bulletin board and simply make a telephone call to transfer funds.[7]

The recurring theme in both error and fraud is a ludicrous breakdown in authority at the point of man/machine interface, where information passes between human and machine.

Computerization appears to require that a given task be separated into two domains. The first is under the control of traditional managers, skilled in the distribution of information through human organizations. The second is directed by the computer specialists, able to store and retrieve data housed in a bewildering array of machine systems. Very few people are able to bridge the two domains — specialist experience in one usually coexists with childish ignorance of the other. The result is needless waste and an alarming degree of risk.

Green Light, Shading to Orange

So, there is ample ammunition for gloom and doom merchants. It would seem our youthful profession is not only engaged in social mischief, but is criminally negligent to boot. Little wonder that computer centers have been classified as legitimate bombing targets by political terrorist groups in Europe. Distrust of technology is a strand that runs through a variety of political groupings, whose members are concerned about the direction our society is taking.

This disquiet is evident even within the mainstream of Australian political life. It is now generally accepted that the management of technological change is a legitimate concern of governments.

Until recently, most of us concerned with the drafting of automation policies were virtually given a carte blanche to implement those ideas that seemed appropriate to our immediate situation. It is reasonable to expect that in the future we will need to be prepared to justify our decisions within a much wider social context.

If we fail to accept that challenge, we are likely to find our professional lives circumscribed as described in the explicit warning expressed by Justice Kirby, chairman of the Australian Law Reform Commission. "People involved in the computer industry would have themselves to blame if lawmakers produced cumbersome, unwieldy and inefficient data protection and security legislation . . . If the computerist remains silent, he will do a disservice to society."[8]

Few of us would remain in our profession if we believed it practiced a form of social delinquency. In fact, most of us probably view the computer as simply another tool (albeit uniquely powerful) within the long series that has allowed man to refashion human life continually within an ever-expanding range of options.

Our view of history is optimistic, in that we view man as always having chosen progress (eventually) and enrichment rather than decay and destruction. Technology is perhaps ourselves writ large and, like mankind, is more good than bad. The key word is choice and we must not lose faith in our ability to choose wisely.

In particular, the arguments of most critics appear to contain two essential flaws. The first relates to the computer as an economic tool, the second to its role as an extension of human intelligence.

The central economic problem, of course, is to distinguish between labor displacement and labor reduction. All wealth is recycled, including that created by reducing the labor cost within a given organization or industry. Only those people who will not see will fail to recog-

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nize that income for one person is necessarily cost for another, and that money saved by reducing that cost necessarily creates effective labor-producing demand within another sector of the economy. Individual incomes represent our personal share of national production. The nation that uses the most productive techniques available will be able to offer its citizens the best possible job/income choices.

Thus, in the Australian context, the report by the Committee of Inquiry into Technological Change (Citca) states: "The available historical evidence shows that technological change has in the long term created wealth and employment, and future technological changes will continue to have this effect."[9] During the 1970s, when the so-called job holocaust began, the Australian work force actually increased from 5,137,000 to 6,415,000.[10]

Our dole queues are not the result of a sudden decrease in the capacity of our economy to provide work, but of an unprecedented demand for nearly 50% of the total population to be in the work force. There is no evidence a traditional industrial economy could support that level of participation. The more flexible work patterns of the information economy provide our best possible chance of satisfying the new level of demand.

But, of course, the computer is more than an economic implement. It is also an intellectual tool, which has introduced a new dimension of literacy into human life. We now have a new medium for the storage and transmission of information, and this enhanced capacity strikes at our fundamental concept of a human being.

To quote Christopher Evans in *The Mighty Micro:* "The significance of permanent data storage is the principal and perhaps the sole reason why Man is absolutely the dominant creature of the planet. All nonhuman animals carry their knowledge and experience with them when they die. Man can preserve the richest fruits of his brain power and stockpile them indefinitely for his descendants to feed on. The gigantic advances in human societies over the last ten thousand years have been due to this capacity to record and preserve information."[11]

It is the intimacy of the connection between the new information machine and man's defining intelligence that many people find disturbing. They fear we have created a force that may escape beyond our control.

If that fear breeds an attitude of caution, then it will serve us well. However, if it creates an atmosphere of blanket distrust of the new technologies, then it will have persuaded us to choose ignorance in preference to knowledge. It is difficult to believe any substantial scientific work is under way today that does not use the assistance of data processing facilities. The publication and distribution of books, the traditional stores of both cultural and scientific knowledge, already utilize computerized typesetting and will almost certainly

(Continued on Page 40)

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Therefore, there is no simple-minded choice between the interests of machines or people; the machine is already integrated into man's loftiest endeavors. It is a knowledge tool and the pursuit of knowledge is inextricably interwoven with any reasonable definition of human progess.

The very large-scale integration threshold cannot be measured simply in dollars and cents or bits per chip. Its true significance lies in the new degree of pervasiveness it introduced for the computer phenomenon.

Children born after 1970 already accept the microchip as a normal element in their social environment. We can only hope for their sakes none of them leaves the education system without mastering elementary skills in the manipulation of machine-bound data. They must be computer literate if they are to function properly in a postindustrial society.

This pervasiveness should persuade members of the computing profession to reexamine our role. Many of our attitudes reflect the early years of computing, when we were the "experts," introducing new concepts to people who could not be expected to understand the intricacies of the new techniques. It was only natural that information became opaque to the lay user as it entered the machine; it had passed from their own domain into that of the computerist.

In the future, responsible users will not be satisfied with opaqueness. They will demand a clear understanding of the processing options available and these will need to be described in an understandable language. The superprogrammer who can converse only in the sterile jargon with which we have surrounded ouselves will be a liability to an organization that wants data to be intelligible and accessible to a variety of people.

From this follow the recent articles in professional literature about the "fuzziness" of "friendly" systems (at least the jargon is becoming less intimidating!). What is actually happening is computer applications are being molded to fit people, rather than the reverse. These poeple are retaining the ambiguity and flexibility of thought foreign to the binary yes/no logic so beloved of the many people attracted to computing as a full-time career.

The people who design and install such applications will need to invest a major part of their professional effort in learning to understand the human environment in which the crucial man/machine interface will take place. The importance of the machine elements in the total system will fall into pace with the continuing drop in hardware costs.

'Computerists? Who Needs Them?'

Of course, the computerist's first new task may be to justify his own existence. Basically, we earn our salaries from our ability to manage the complexity that can lie between an end user and the computerized data.

Many users that have tasted the first fruits of the micro revolution would argue the complexity is now entirely unnecessary. Given cheap hardware kits supported by basic operating systems, they consider themselves fully able to exploit the technology. In their view, computing specialists will be concerned only with a diminishing proportion of computerized information, attending those few areas where "big is beautiful" — airline reservations, telecommunications and so forth.

To some extent, the issues have been covered in the centralized/distributed processing debate within commercial DP. In many instances, there is no doubt the specialist is an inefficient and unnecessary encumbrance to the sophisticated user. In other cases, of course, the untutored amateur will only repeat the same dreary litany of mistakes known to anyone who has worked in a low-caliber installation.

Whichever way the decision goes in a given situation, it will be influenced more by what happens outside the machine components of the system than by what occurs within those components. The computerist

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who tries to restrict the debate to purely technical considerations will be cutting himself off from the substance of the issue.

One Hand Clapping

On all these emerging issues, there is a clear need for an improved dialogue with those others to whom the new processes are foreign and threatening. To date, the two groups have seen each other as mirror-images.

One group is strong on social issues and weak on technical issues. The other has technical proficiency, but doubts its own ability to sustain a debate on social issues. The lack of an informed dialogue between the two camps does a disservice to the general community in that it receives contradictory assertions on side issues (such as how many jobs are being destroyed?) and little positive guidance in crucial matters (for instance, in what sectors will there be job growth and reduction?).

Enlightened self-interest may be the spur that will goad the computing profession into venturing further out from its traditional area of technical proficiency. The Citca recommendations, which are as optimistic as even the most ardent technologist could have hoped, have specified the need for a "social net" to assist people temporarily disadvantaged by the accelerating rate of economic change. Even that simple injunction will necessitate computing professionals' contributing to:

- Definitive work load analyses "before and after" new system applications.
- Identification of appropriate areas of likely employment growth for persons displaced from employment.
- Support for educational authorities to provide retraining programs suitable for the economy of the future.

Clearly, the demand is for computerists with the communication skills necessary to work alongside people from a variety of backgrounds — such as managers, trade union leaders, educators and accountants. The crucial relationships of our professional lives will be with the people who use our systems, rather than with the equipment and the like-minded specialists who attend it.

Few community leaders appear to understand the full potential of the computer age. The primary task of our profession is to make that potential understood.

To do so, we must learn to communicate with a very wide range of people and to accept that often their obvious ignorance of our field of technical knowledge is more than matched by our misunderstanding of their own areas of expertise. We obviously have a lot to learn, but we also have the opportunity to participate directly in resolving some of the most important questions our society will need to answer throughout the next few decades.

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The Case of the Deceived Computer

By Julian Burnside
Special to CW

The law and computers are strange bedfellows. As the law, with its ancient and slow-developing doctrines, is confronted by an explosion of computer technology, some strange contortions result.

A fine example can be seen in the reported decision in U.S. vs. Jones and in the appeal from that decision. Because of its unusual structure, the case provoked arguments that ran against expectations. In addition, it raised the fundamental problems of whether a computer can be deceived and whether it is an entity distinct from its operator.

The defendant, Amy Jones, was charged with "transportation in interstate commerce of stolen converted or fraudulently obtained securities," namely, five checks with a total value of $130,000. The checks were all payable to Inglis, drawn on the account of Inglis, Ltd.

Inglis, Ltd. is a Canadian subsidiary of Whirlpool Corp.

Like all good North American companies, Inglis has a computer. So far as it was concerned with accounting functions, the computer had a check-writing facility for accounts payable. The only data necessary for that operation was an account number and invoice total. Given that information, the computer would retrieve the name and address of the account number and write a check for the invoice amount. The check was signed by the machine, with a registered facsimile signature.

Jones' accomplice, Michael Everston, worked as a supervisor of the accounts payable department at Inglis. Everston created an account in the name of A.L.E. Jones and gave it the number 98844. He then selected five Whirpool invoices and altered the account number on them to 98844. The altered invoices were entered and, in the ordinary operation of the system, five checks were output and mailed to Jones across the border in Maryland.

Jones banked the checks in her account. She was charged with "transportation of stolen converted or fraudulently obtained securities." As a preliminary point, the defendant argued the charges should be quashed on the basis of an exclusion in the relevant statute (18 U. S. Code ss. 2314, 2315). The statute does not apply if the securities are "falsely made, forged, altered or counterfeited."

Thus, the defendant argued the checks were forgeries and the prosecution argued they were genuine. The prosecution argument depended on the assertion that the checks contained false statements, but were genuine documents. It is clear law that where the falsity of a document lies in its content rather than its making, it is not a forgery.

The district court held the prosecution argument applied only in cases where the person who made the genuine document was deceived by another to include in it false material. However, he held that in this case the document was created by Everston alone, through the passive medium of the computer.

Accordingly, the district court held the checks were forgeries just as if Everston had, without authority, written and signed them himself. This finding led to the anomalous result of the charges having to be dismissed. However, it seems to be a practical solution since it regards as forgery that which would have been forgery if done without the help of a computer.

The prosecution appealed and the appeal succeeded. The district appeals court held the checks to be genuine, on the basis that Everston's misconduct defrauded the accounting department of Inglis into believing that Inglis owed certain sums to the defendant, and that the accounting department thereupon issued valid checks in respect of those sums.

The interest in this conclusion lies partly in the central notion that the "accounting department was defrauded" into believing a certain state of facts to be true. On the evidence, it appeared Everston shepherded the altered documents through the system to minimize the risk of detection. No individual in the accounting department appears to have been deceived. It cannot be accepted that the "accounting department" was deceived, because it was not even a legal entity.

It appears the court really meant the computer was defrauded, since it was the computer alone that paid any attention to the account numbers on input documents, and the computer alone took positive action on the basis of those numbers being correct.

Consequently, the court can be understood to have held that it is possible to deceive a machine, in the legal sense. Implicit in its departure from the reasoning of the district court must be the notion that the computer was not merely a passive tool by which Everston himself wrote the checks.

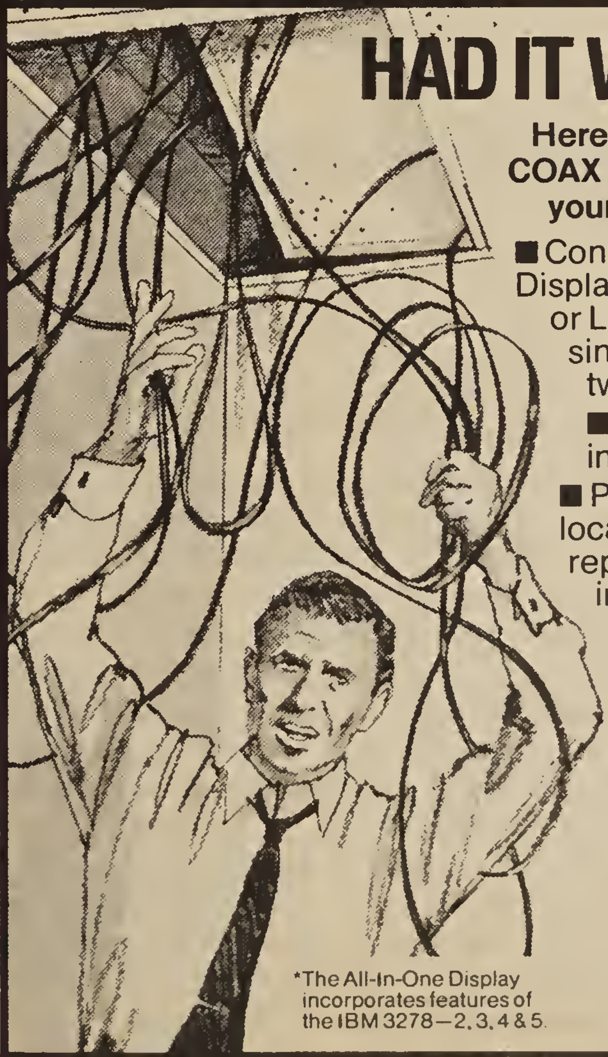
Although the court did not expressly say so, this appears to recognize a cognate legal personality in the computer. If so, it is to be applauded. It is manifestly sensible that computers should be treated in law as minds rather than as machines.

By the same token, the decision appears to rest responsibility for the misuse of a computer on the owner. It regarded the computer as an extension of Inglis, whereas the district court regarded it as an extension of Everston for the purpose of writing the checks.

The decision raises interesting possibilities if the appeal court was right in regarding the checks as genuine. Several forms of computer output can constitute negotiable assets: share scrip, bills of exchange including checks and, in a different way, electronic funds transfer (EFT). If these documents and transactions are genuine, the risk of loss is enormous.

For the present, the score is Christians 1, Lions 2.

Burnside is a barrister-at law, Owen Dixon Chambers, and a contributor to Australasian Computerworld.



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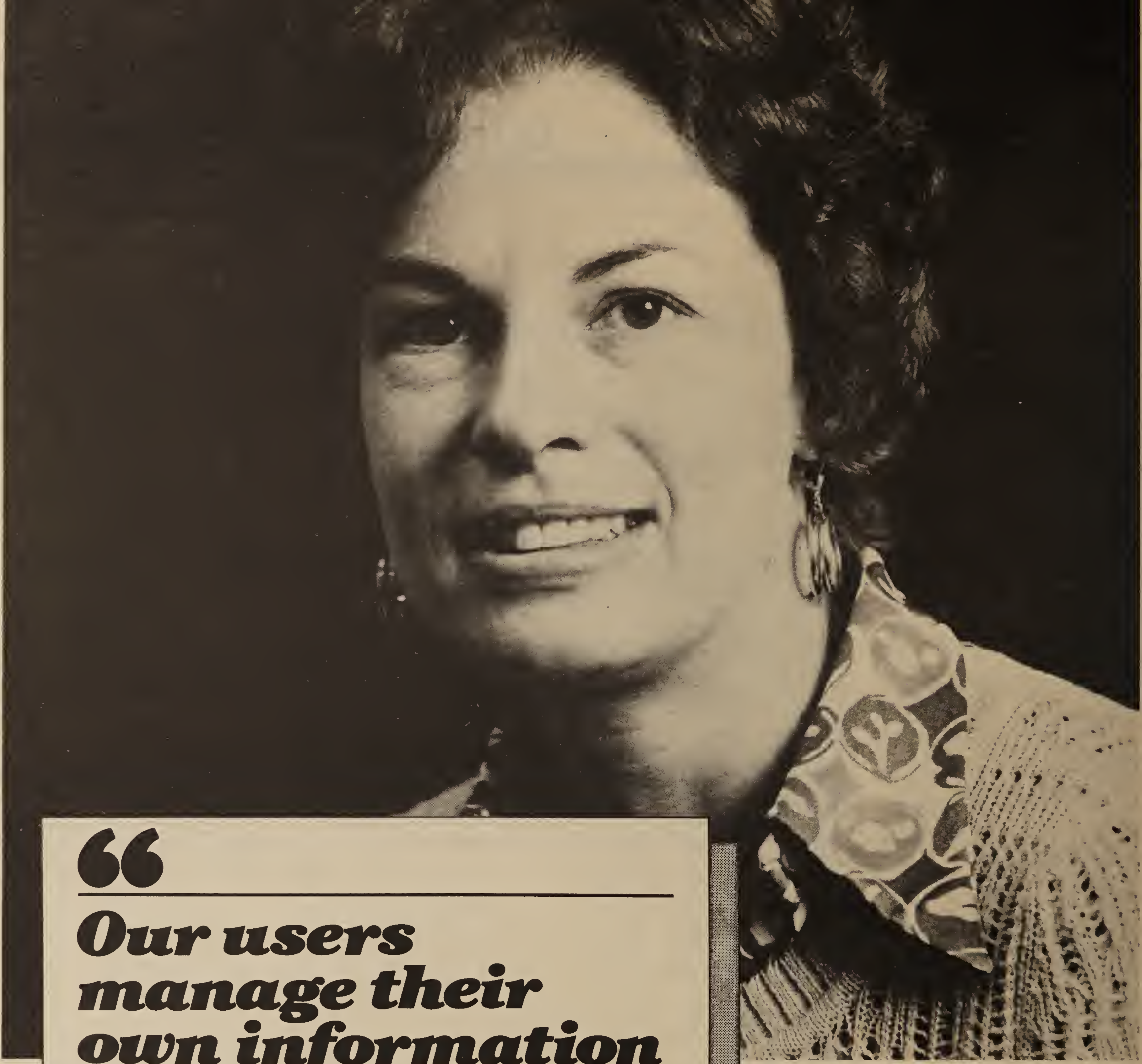

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(Continued from Page 41)

It is unfortunate our profession has so far attracted few people with an academic background in the humanities or social sciences. Whether we like it or not, we currently stand as custodians of a powerful new information source that is going to affect every sphere of human life.

It is important that the computer revolution not be considered the province of a particular "type" of person (oriented towards mathematics, science and business). Inevitably, it will affect all people and all organizations. We share a complex and highly interdependent society, in which people are aware that any significant change to one section of the population necessarily influences the lives of all other people.

At present, many ordinary citizens must believe the computer is a tool of the powerful — big business, government, scientists and professional elites. The benefit it offers to these citizens as individuals must appear rather marginal — video games, faster airline reservations and so on.

Those of us who believe the computer offers enormous positive potential appear to lack the confidence or skill to present our case. Unless we remedy that situation, our professional lives will be curtailed by legislation in ways we consider unnecessary and harmful.

One simple educational procedure may be to choose senior computer users, rather than fellow practitioners, to address our meetings and seminars on applications of interest. We will no doubt be told of many faults, but we also will learn why the new solutions are almost invariably superior to the old. This knowledge will add authority to our judgment that our profession is engaged in work that enriches the life of the general community.

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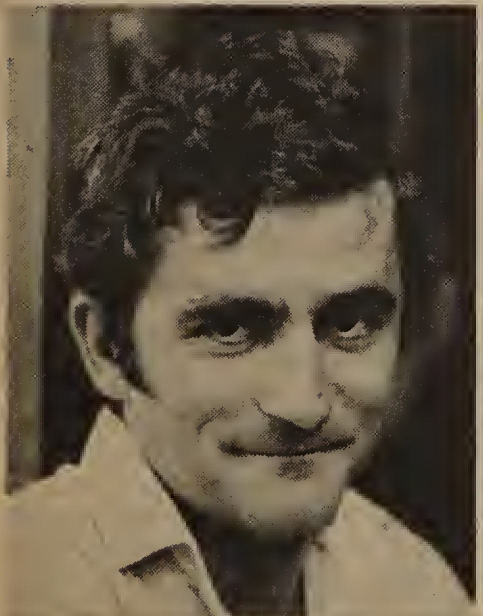

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CICS/VS Testing & Debugging • Use program dump to diagnose abends • Apply Trace, Dump and EDF facilities • Testing techniques for CICS/VS environment • Program testing and debugging workshop	CICS03	8-11	13-16
CICS/VS System Design • Design systems that utilize CICS/VS facilities effectively • Use program, file, terminal and data management services • Format screens using BMS and 3270 IDS facilities.	CICS04	21-24	26-29
DMS/CICS/VS Design and Programming • Generate on-line applications • Utilize supervisor and system functions • Code calculation, edit, control routines • Apply panel hierarchy techniques	DMS01 DMS01	8/31-9/3 9/28-10/1	13-16 19-22
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VSAM Using Access Method Services (AMS) • Design and implement VSAM file structures • Use AMS commands to manage VSAM catalogs, data space, datasets • Create and use alternate indexes • VSAM recovery procedures	VSAM02 VSAM02	14-18 9/28-10/2	26-30
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DL/1 Applications Programming • Logical/Physical data base structures • Code DL/I calls to retrieve, update, add or delete segments • Build segment search arguments • Process status codes • Establish data base position	DL01 DL01 DL01	8/31-9/2 14-16 21-23	19-21
IMS/VS Data Communications Programming • Describe IMS/VS message flow • Code DL/I calls to send and receive single or segmented messages • Design and code conversational programs • Use batch message processing facility	IMS02 IMS02 IMS02	3-4 17-18 24-25	22-23
IMS/VS On-line Message Formatting (MFS) • Create and use device formats • Create and use message input/output descriptors • Format screens using MFS and 3270 IDS facilities • Compile MFS source statements	IMS03	9/30-10/2	
DATA BASE DESIGN Principles and Procedures • Analyze data requirements • Describe logical data base design procedures • Define hierarchical, network, inverted file and relational DB structures	DB01	14-17	
PROGRAM & SYSTEM DEVELOPMENT			
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EDITORIAL

Predicting the Future

Why does anyone believe a computer model can accurately predict the course of the U.S. economy?

Nobel Prize-winning economist Lawrence R. Klein has said an econometric model implemented as software on his company's computer shows President Reagan's tax cut plan will not lead to the increases in gross national product (GNP) anticipated in Reagan's speeches [CW, July 20].

Econometric models tend to be complicated affairs with many variables to consider. These variables are typically assumed to interrelate with each other in ways so convoluted that econometricists are necessary as interpreters.

After constructing models based on ideas about what the variables do to each other, econometricists use computers to advise mighty governments and corporations on how to meet the future. Government officials commonly cite such advice as sufficient grounds for new taxes — or tax cuts — and corporations indicate they heed the advice in setting prices and adjusting inventories.

Obviously, these models are important and influential. But should they be?

The data fed to econometric software is quantitative in nature, but the reality addressed by this software may not be so quantitative as those who award Nobel Prizes imagine.

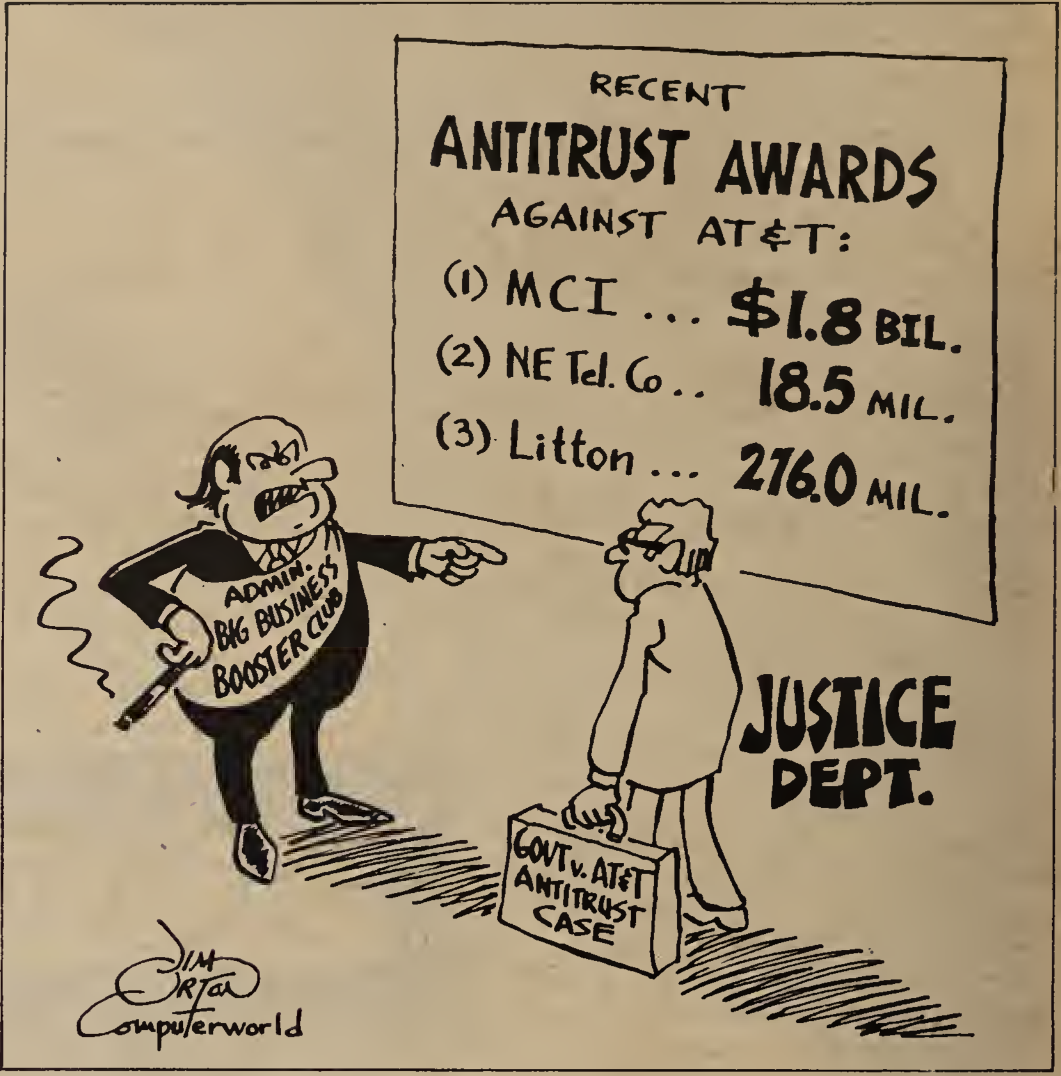
For example, econometric models generally assume that 10 units of a good are worth 10 times as much as a single unit. This assumption is implicit in the concept of GNP, which is defined as a sum of values (in dollars) for the nation's output of goods and services.

But another breed of economists has observed that a cup of water may be more valuable (in dollars) to a man dying of thirst in the desert than 50 gallons of water to a resident of Arlington, Va. In fact, that man in the desert might value the cup of water more highly than a cup of diamonds, while the Arlington resident might think much differently.

This reasoning by economists who typically spend little time around computer facilities implies that quantitative information alone is insufficient grounds for predicting economic trends. Worse yet for government officials, this reasoning implies economic trends cannot be predicted accurately years into the future.

That means "fine tuning" of the economy on the basis of computer models — through adjustments of tax rates and the money supply — are really stabs in the dark.

And that means a lot of the analysis behind public policy or criticisms of public policy may not be worth the paper on which they are printed out at computer facilities across the nation.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Computerworld

'So give me four good reasons why you shouldn't drop it!'

DATA PAST

Five Years Ago
July 26, 1976

PASADENA, Calif. — Computer systems played an essential role in transmitting and developing the pictures of Mars' surface taken by Viking I cameras. After the cameras on board the Viking I lander captured pictures of the red planet, they were stored on Intel Corp. 1M-byte memory systems in digital form.

Ten Years Ago
July 28, 1971

WASHINGTON, D.C. — An amendment to a Justice Department appropriations bill aimed at delaying the establishment of new computerized data banks and of a substantial expansion of existing systems was defeated in the Senate, 58 to 29.

— — —

WASHINGTON, D.C. — Users and vendors were urged to comment, within the next month, on a proposed Cobol standard developed for federal agencies by the National Bureau of Standards (NBS). Under the NBS plan, all business-oriented applications developed or acquired for use by federal agencies would have to be written in the Federal Standard Cobol. Other languages were being considered for future adoption as Federal standards. .

LETTERS

Irus Appreciates Decus

Although your article about the Independent RSTS users Society, "Users of DEC's RSTS Go Independent" [CW, July 6], focused on some of the historical reasons for the formation of Irus, we want to make known our appreciation of the role that Decus plays.

Virtually all Irus member installations are Decus members and we encourage participation in both Decus and Irus. Decus serves a valuable and legitimate purpose in maintaining open lines of communication between DEC and its customer base. Irus is not trying to replace Decus; rather, we are working to supplement certain areas of support.

What is special about Irus is our success as a volunteer organization in mobilizing users' energies and invigorating the marketplace. For example, our Access-11 trade show and conference in October will provide the first large-scale opportunity for RSTS and PDP-11 users to meet face to face with all interested vendors on "neutral" ground. Our goals are positive ones that ultimately will benefit the entire DEC community, users and vendors alike, including DEC and Decus.

Anyone wishing further information may contact us at Irus, P.O. Box 3043, Pawtucket, R.I. 02861.

Howard Brown
Chairman, Irus
Pawtucket, R.I.

Prime Users Reply

"Prime Forcing Users to Buy New Software?" [CW, June 29] was discussed at a meeting of the Washington, D.C., Prime Users Group and was found to be sensationalistic and not fully researched. The article met with two major criticisms.

First, the article should not have been on the front page. Prime's practice of charging for new, expanding software is an old policy and is hardly news. Prime still supplies and supports ED, FTN, Basic, Midas and many other free utilities even though expanded versions are available at a cost.

Second, we found the article misleading. It implied Prime was about to withdraw support from some software when, in fact, they have only decided to stop additional development — quite a difference. The free software has been in heavy use for years and is stable and bug-free.

Some of our members have been using Prime software for many years and all of us have been consistently satisfied. Prime has always been responsive to users' concerns. Perhaps CW is not sufficiently acquainted with Prime's high standards.

Alan W. Axthelm
Prime Users Group
Washington, D.C.

Heads in Sand

It was revealing to read in "Users, DP Agree on Success Keys" [CW, July 6] that only one item in a subcategory of keys to DP success mentioned development of DP personnel in the department.

It was obvious to those attending the MIT conference and those who replied to the survey that DP as a function is still buried in a technology focus. The most significant factor for success — personnel motivational management — still hasn't registered with current DP managers.

When DP management personnel get their heads out of the sands of worship at the shrines of technology and to realize management means people and motivational management, then progress toward greater DP successes will be evident. When will that day ever come?

John Callahan
Terre Haute, Ind.

SOFTLINE/Werner L. Frank

Software in Context: 1950 to 1980

From the outset of computing, the design and structure of software has been determined by the physical limitations and constraints of the hardware, coupled with maximizing the use of these hardware resources. The needs and convenience of the programmer and user were a second consideration. Today, however, these priorities are reversing, and we must reevaluate our approaches to software implementation philosophies, the associated architecture of computer-based applications and the functionality of such programs.

A brief review of the evolving history of programming the computer is in order. During the past 30 years, there have been periodic shifts back and forth in overall design consideration from monolithic, free-standing system operations to shared-resource configurations. Such architectural differences have, of course, affected software development.

In the earliest days, there was one computer and one user at any one point in time. Today we have once more, although for different reasons, embraced this approach with the introduction of the personal computer (now dedicated to a single user).

The environment of the early '50s saw the individual "user" in complete control of all the computer capability, ranging from the memory and CPU cycles to the use of storage, and including the I/O peripherals as well. During any given time period, the machine was dedicated to one purpose — a specific job — and controlled by one user, who more than likely also served as the computer operator. Those were the days when an $8,000-per-day programmer took command of a $2.4 million machine for a scheduled one hour of checkout or operating time. Therefore, the man-year-to-machine direct cost ratio was 1:300.

This seemingly adverse ratio called for better exploitation of the hardware. Typically; the capacity of the system was not utilized fully by any one user during any given period of time because of the disparity of CPU and I/O performance in conjunction with the usual mismatch of a job's need for processing vs. data transfer. Hence came the notion of multiprocessing and time-sharing, permitting the overlapping use of machine resources — as well as sharing of devices — by memory cohabiting and coexecuting jobs.

Systems Management

The serial utilization of the computer by successive users was then displaced in the early '60s by increasingly sophisticated operating systems acting in the role of a systems manager and resource scheduler. Subsequently, the time-sharing notion was introduced, which facilitated simultaneous multiuser access and operation with respect to a centralized system. Although good measurements are not now available, these moves — coupled with the then-favorable trend in hardware economics — probably shifted the man-to-machine cost ratio by as much as a factor of 10, bringing the relation to 1:30. However, this ratio, was further affected by the then-inflating trends in labor costs, which led to an effective ratio of 1:20.

While time-sharing and complex operating systems were primarily motivated by a desire to lower unit costs of computing through better exploitation of resources in any given time notch, a secondary and most important contribution evolved, the possibility of program and data sharing.

This need arose because of the emergence of data processing applications where multiple users had simultaneous needs both for accessing and operating with the same data (airline reservation systems, missile and space flight, command and control) and for performing similar functions.

But then came the minicomputer and the possibility of returning to the earlier environment of one application and one machine. We saw a separatist movement emerge that discouraged the centralized sharing approach and encouraged a disengagement to free-standing and dedicated systems. In terms of man/machine economics, we probably reached a then-cost imbalance of $20,000 to $300,000, or 1:15. Normalizing, however, the computer power of the mini to the earliest of the mainframes, this ratio more correctly should be 1:3.

The mini environment afforded the opportunity of near-simultaneous access by a number of users so that further hardware exploitation was possible. Thus, for an appropriately configured four-terminal system, the normalized man-to-machine cost relation approached parity.

The underlying trends shaping system configuration and software structure in the early '70s were motivated by two primary considerations: Maximizing the exploitation of the system's most valuable hardware resource, and sharing of data whenev-

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HUMAN CONNECTION/Jack Stone

New Users Mean New Problems

Surely now is the time for all good DPers to recognize that, for new installations, probably the most difficult problem to solve is that of "welding" the users into the computer environment. By this, I mean not only training these people to apply and operate an information systems properly, but also orienting (conditioning) them to develop constructive attitudes and understandings toward critical areas. These critical areas include:

- How an information system can provide direct assistance to employees in their performance on the job, enhance their own professionalism and proficiencies and advance career development.
- How a system can provide the basis for a consistent and comprehensive information infrastructure within a firm and why this is so significant to the firm's operating success.
- Why DP systems require changes in organization, methods and procedures, personnel assignments and supervisory responsibilities and why these changes are of value to the enterprise.
- How systems are implemented at the current level of the state of the art, therefore subject to occasional machine and software failures and what the users can do to control or at least manage system failures and data errors.
- Why systems are developed on an evolutionary basis, in fact, consistent with abilities of users to absorb the changing information processing environment.
- How people without prior experience can be trained to work with the systems in positive and constructive ways.

Exploring Human Issues

Although many DPers know the systems development process involves a host of interacting social, technical, personal, organizational and communications factors such as those noted above, my experience has been these matters are not addressed properly at installation planning time. There are a variety of reasons for this.

"Integrating the system into business operations is the responsibility of the users," many analysts say. Then, to make it perfectly clear, they go on to proclaim that DPers' responsibilities end with delivery of the hardware, software, some documentation and a couple of briefing sessions. The weakness of this policy is that the human complications are merely brushed aside.

Other analysts are sensitive to human issues and attempt to resolve them, but don't have the knowledge of, or training in, social psychology. Therefore, the human factors are handled poorly.

And a minority of DPers seem to conlude (or is it wishful thinking?) that users have bathed in data systems since their childhoods and that they will promptly embrace new terminals with endearing murmurs. However, because this situation is hardly the case, terminals are often misused and, in some cases I've seen, unused.

Part of the problem, I believe, should be attributed to the developing awareness of the population to the widespread applications of computer technology during recent years — since micro vendors began advertising home and small business computers in the mass media. We DPers have not spent enough time in figur-

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READER COMMENTARY Peter Konieczko

Programming Remains An Art

How does one go about writing structured programs? I really don't know. I have been writing programs that resemble good structure for nine years. I follow most of the conventional rules, bend some and add the flavor of my own set of guidelines. But if someone asked me to explain the mechanism that creates a program, I could not answer his question satisfactorily.

The difficulty in articulating the process of writing a computer program doesn't bother me. There is an element of art in programming. A comparison with another discipline might provide some insight.

Some comparisons between programming and the construction of a building have been made, especially in offhand discussions of structured programs. Perhaps you have heard the flip remark — you don't build a house by first putting up the windows, then the frame. The comparison is patently false. Construction has physical constraints that determine the order of events. Programming is not ruled by any physical limitations. Words on paper do not fall to earth when installed before the superstructure is built.

Better Comparison

A better comparison can be made to the field of architecture. There is that gamin-like element of art in architecture. A building designer is concerned with form and structural balance, with compatibility of form and function and with other more illusive concepts. The architect builds with ruler, pencil and paper. He changes it, shuffling parts around until he achieves the desired effect. Similarly, a programmer molds and prods and realigns his code until the symmetry of his program agrees with the symmetry of his problem.

If one were to describe the concept of "top-down" program design in nonarchitectural terms, it might sound like this:

"First, paint the house blue to match my car. The house is a one-story ranch with outside dimensions of 24 feet by 48 feet. It will have two

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Software in Context: 1950 to 1980

(Continued from Page 45)

er the application required multiuser access.

Together, these factors influenced software construction over the years with the following results:

- Evolution of multilevel interrupt capabilities and interrupt scheduling.
- Need for data control mechanisms with regard to access, maintenance and coordination.
- Requirement for multilevel and multisource security measures.
- Demand for complex contingencies in case of failures.
- Requisite for reentrant programs.
- Need for centralized data definition.
- Necessity for standardized interfaces between software modules.
- Need for audit trail and accounting-related performance statistics.
- Requirements for highly efficient programming languages and operating systems that simultaneously could maximize memory utilization and throughput performance.

Software was also influenced in yet another way. This was the result of the changing demands with respect to the man/machine interface itself. In the beginning (after we escaped the tangled world of punched-paper tape), the punched card served as the basic unit for both input and output. The world was made up basically of 80-character strings of information transfers. This soon changed to an orientation that focused on the asynchronous exchange of single bytes caused by the use of character-at-a-time teletype communication.

Finally, the economics of terminals evolved and video screen displays became widespred in use, bringing with them the need for attendant support.

Therefore, software needs were extended to include:

- Remote access via a variety of communication handlers and protocols.
- Excessive new processing loads on the CPU with respect to the message and data transfers.
- Buildup of more automated error and recovery methods operable in an on-line mode.
- Evolution of full screen-oriented communication in support of the movement to "user friendliness."

All in all, in terms of software, this has meant more complexity in the operating system, more sophistication in interface design and coordination, more need for storage capacity and more demand on throughput performance to match the on-line interactive needs. In a word, the overhead in processing built up enormously, and relatively fewer resources were available for the applications.

Advent of Microprocessor

But then came the microprocessor, which changed the fundamental economics once more. We now have the most remarkable reversal in balance, matching a $24,000-per-year DP user with an $8,000 fully configured microprocessor-based system. Such capability is no less than that which was available to individual users employing the earliest million-dollar computers.

Our present day man/machine ratio of 24,000 to 8,000 is, therefore, in a relation of 1:0.33. Contrast this to the starting point of 1:300 of 30 years ago — a switch in economics by almost 1,000. By 1985, we foresee this ratio eroding even further — namely, 1:0.10.

We pick up on this inflection point and its effect on software structure in a subsequent column.

Frank is executive vice-president of Informatics, Inc. in Woodland Hills, Calif.

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A hunter shoots one.
How many storks are left on the roof?

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New Users, New Problems

(Continued from Page 45)

ing out how we should adjust our installation programs to compensate for this change.

In coming weeks, I'll be discussing some system installation strategies and techniques — based upon the pragmatic application of the principles of social psychology — that I've come across and in certain cases have had the opportunity to apply.

As an example, let me comment about those users who are allegedly frightened of computers and wind up with some level of responsibility for system operations. I've met an awful lot of users in the training rooms, but I've never met one truly fearful of the machines.

I have met some who flatly don't relate to computers, but they were not dummies. They just couldn't handle any equipment — they couldn't type, drive a car well or deal with arithmetic. (You can spot them easily in a terminal training class: in spite of endless hands-on exercises, when the training is over they still can't identify the differences between the RETURN and EXECUTE keys).

These people obviously should not be involved in the automation program, but if they are assigned, the typical DPer would probably avoid them like the plague. A much better approach would seem to be to tailor a make-work task to their expertise level to make these users feel they are participating. In this way, they would tend to support the project instead of trying to scuttle it.

LETTERS

'Unions Are Backward'

I am deeply concerned about the outcome of the Union Pacific's computing staffer's hearing in which they tried to nullify the Brotherhood of Railway and Airline Clerk Union's takeover [CW, June 29]. I had always assumed DPers were immune to unionization.

Unions have singlehandedly done more to damage the economy than any government policy or regulation.

Fact: Unions are backward, nonprogressive entities. They have a penchant for retaining obsolete jobs, such as the fireman on a diesel locomotive whose job it is to shovel coal. (The union would not let this job die a peaceful, reasonable death.)

Fact: Unions are directly responsible for reduced productivity and quality. Common sense will tell you that when you guarantee a group of people their jobs, a percentage of them are not going to care about their work anymore and, thus, productivity and quality will suffer.

Fact: Cost of living increases, (usually built into any union contract), do not increase a person's buying power, but simply reduce the value of the dollar for everybody. If a grocery clerk gets a cost of living increase, management must increase prices to pay for that increase. Does the clerk's money buy him any more groceries? No.

In our country, the only thing we have to back up the dollar is productivity. If wages increase without a proportionate increase in productivity, the value of the dollar can only decline.

Solution: Management removes payroll as an expense and gives to the union a percentage of the gross profit. The union then becomes responsible for payroll and all the expense and headaches that go with it.

There are many effects this would have. First, if the worker's productivity and/or quality decline (or if sales fall off because of natural supply and demand effects) they will feel it directly in their wallets. The worker who is incompetent or uncaring will become a burden to the other workers, who in turn can file a grievance against the worker to the union. If the union chooses to keep the worker, then everybody suffers for it, not just management. The union would no longer be motivated to keep obsolete jobs. A company that isn't profitable would fold. However, new markets would open up and new jobs would be created. Obsolete jobs would be retired with dignity.

I had hoped that DPers would be immune to all the negative effects of unions, but if school teachers can be forced to unionize, I suppose that none are immune. (Look at the decline in the quality of education — it is next to impossible now to fire an incompetent teacher. Those smart enough to teach are no longer willing to be paid less than a unionized bus driver in Chicago.)

The union's primary task is to ensure reasonable compensation for the work done, to ensure safe working conditions and to protect the worker's rights. Now that we have laws to ensure this, let's hope the union's power to damage the economy can be rendered impotent by similar legislation.

If you wonder why your dollar is worth increasingly less and less, ask yourself what productivity a particular bus driver in Chicago making more than $60,000 a year is adding to the economy.

John Morgan Ford
Synergistic Office Systems
Mundelein, Ill.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, *Computerworld*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Forms of Amusement

To paraphrase Benjamin Disraeli, "Everyone likes flattery, and when you come to DP professionals you do lay it on with a trowel."

"Changing With the Times" [CW, July 6] reflects convenience, conventional wisdom, comfortable compliance and the cautious charades of ordinary civilizations, all of which express the antithesis of the few Pascals the world has ever known.

What is needed today is the presence of a vision outside of so-called technology. Extraordinary intelligence, genius or even prescience cannot, and have never, served to constitute that total person perhaps symbolized by Pascal, who noted, "amusement that is excessive and followed only for its own sake, allures and deceives us."

Beyond healthy life, isn't most else some form of amusement?

Richard Shemtob
New York, N.Y.

DPers and Manuals

M.A. Ritlaw's recent article on standards [CW, July 29] appears to ignore the basic problem with standards manuals — most DPers do not like them. Thus, the approach seems doomed to failure.

Perhaps Ritlaw's theory needs more real-world application prior to its considerations by any potential standards developer.

Harvey M. Weiss
Weiss & Associates
Aurora, Colo.

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Programming Remains an Art

(Continued from Page 45)

areas, living and sleeping. The living area will have dimensions of 24 feet by 32 feet. Now, what rooms can I fit into the 24 feet by 32 feet? And so on.

The last question in the top-down scenario is bothersome. Why must the living area be 24 feet by 32 feet? Why couldn't it be 24 feet by 24 feet or 22 feet by 36 feet?

If an architect paints his house first, then somehow he knows that 24 feet by 32 feet are fine dimensions for a living room, dining room, kitchen and bath. Suddenly, the top-down approach from structure to detail is not a simple, incremental process. What came first, the paint or the insights?

The same confusion about the top-down method occurs in programming. One draws a box. It is labeled "merge." But the programmer sees before him records streaming in from two sources and continuing out one at a time. The programmer may label the structural component as "merge," but his sensual and logical impressions are at a much more detailed level.

It appears that I have never written a program from the top down. In the beginning, I thought I was programming, but was really building outhouses and learning my trade. After programming became an art form to me, top-down programming became a charade.

It has always been true that programmers begin to code too soon, before the solution gels into a suitable form. But one can also wait too long. Then, the structure and the detail overwhelm the solution and preconceptions harden to the point where the slightest change shatters the entire effect.

I usually begin to code something when I "see" the merge take place. If I code before that magical point, I lose track of any solution because I am only dealing with the problem. If I dwell on my vision for too long, two very unfortunate things happen: I become bored with the problem, because I have already solved it in my own mind; and I artificially narrow myself down to only one solution. My creativity suffers!

I have heard of writers, successful ones, who don't bother to outline. I have tried to program this way — and it works. Start in the middle of a program. Code the details for two modules. They need not be chronologically related, but it helps. Connect the two modules as you think they should appear in the finished program. Continue to code modules, designing them as you need them, until you have completed your program.

Retrieving Answers

Somewhere, in the vast regions of your mind, I believe you have already safe-stored the main-line structure. But suppose it does not surface easily. There are a number of ways to retrieve an answer.

One way to shape an idea is to draw a sketch. Draw a structure chart or flow chart or data flow diagram. It doesn't matter which one. However, it is important that it be done in pen. Pen forces rewrites. Therefore, there is a tendency to simplify the problem down to the essentials. One should also never use a straightedge or a template and notations should be brief. Once the creative juices begin to pour out, they will not wait for a ruler.

Another interesting technique is to begin with a false start. Begin coding the main-line routing immediately. It should be done in pen and should not take more than a page. I like to use the back of a computer listing. After the coding has been done, begin to talk around the code instead of the problem. Quite often, a better way will become evident.

Now I "compose" programs. I still talk about writing programs to my peers. I have tested the term composing once or twice, but never felt any positive feedback. However, "composing" is still more appropriate.

Programming really is an art. How a program transfers itself from one's mind into executable form cannot be described. As thousands of artists have discovered, knowing all the brush strokes is not enough.

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Detach here, fold, and place in post-paid envelope attached through binding.

For Cost-Effectiveness

CDC, DEC at Top in T/S Benchmarks

By Rita Shoor
CW Staff

STAMFORD, Conn. — Time-sharing services that run on hardware made by Control Data Corp. and Digital Equipment Corp. are in a tight race for first place in cost-effectiveness relative to CPU charges, according to Real Decisions Corp. (RDC) here.

RDC compared 24 remote computing services on the basis of 23 benchmark programs written in Fortran, Basic and Cobol and reported the results in its 1981 edition of "Timesharing Decisions."

After running benchmarks on each of the time-sharing services, 21 of the 24 vendors were divided into six major groups to compare relative average CPU costs of the benchmark runs. The six groups were Control Data Corp.; Digital Equipment Corp. with its Decsystem-10; DEC with its Decsystem-20; Honeywell, Inc.; IBM's Conversational Monitoring System (CMS); and IBM's Time-Sharing Option (TSO).

The last two groups include TSO and CMS software running on IBM-compatible hardware, the report noted.

Based on this composite hardware analysis, CDC edged the Decsystem-20 group in terms of second-place finishes and the ranking of all other runs at lower than median cost. However, the Decsystem-20 group scored the most first-place finishes in individual runs — 12 out of 23 — because of cheaper average costs for CPU-intensive Basic and Fortran benchmark runs. Honeywell came in third, followed by IBM CMS, IBM TSO and, coming in last, DEC's Decsystem-10, according to the study.

HARDWARE	TIME-SHARING VENDOR/SERVICE
CDC	Boeing Computer Services/Mainstream EKS McDonnell Douglas Automation Co./DAC-II United Computing Systems, Inc.
DEC Decsystem-10	ADP Network Services, Inc. On-Line Systems, Inc. Rapidata, Inc. Tymshare, Inc./Tymcom-X
DEC Decsystem-20	American Management Systems (AMS)/AM-Share Citishare/DEC Service Landart Systems, Inc. Timesharing Consultants, Inc.
Honeywell	Citishare/Honeywell Service DTSS, Inc. General Electric Information Services Co. (Geisco)/Mark III Foreground
IBM-CMS*	AMS/IBM Service Boeing/Mainstream CTS Informatics, Inc. Tymshare/Tymcom-370
IBM-TSO*	Boeing/Mainstream TSO Geisco/Mark 3000 McDonnell Douglas/TSO

*Includes systems running on IBM-compatible hardware.

The following time-sharing services are covered in "Timesharing Decisions" but were not included in the above groups: Computer Sciences Corp. (Univac hardware) and National CSS, Inc. and Service Bureau Co. (both of which offer "customized CMS systems," according to RDC).

But CPU costs are not the whole story when it comes to time-sharing costs, RDC stressed. The report also profiled storage and connect charges tied to these services. The CMS and TSO groups netted the lowest charges in terms of storage costs, and the CMS group shared low-cost honors for connect time with Decsystem-20, the research firm said.

"Timesharing Decisions" also includes an analysis of the changes that have occurred among 19 vendors evaluated in both the 1980 and 1981 editions of the report. One result of this analysis was the discovery of a 6% gap between announced

(Continued on Page 50)

MSA Accounts Payable System Runs on Processors Under CICS

ATLANTA — Management Science America, Inc. (MSA) has announced the interactive Online Accounts Payable System for IBM 370, 30 series and 4300 systems operating under CICS in OS, VS/MVS and DOS/VS environments.

As an entry is made, errors are displayed for duplicate invoices, invalid vendors, invalid general ledger distribution, balancing errors and other system controls and alerts, the vendor said.

Terminal operators are able to control the various processes regarding check writing, date controls and report requests, according to MSA.

Vendor History

The software package is said to provide information on vendor history and open and paid invoices. It includes a vendor name search designed to display the complete names of vendors and the vendor numbers assigned, according to an MSA spokesman.

As invoices are entered, the Online Accounts Payable System displays the next logical screen without users having to key a request for it, the MSA spokesman continued.

The system detects any balancing errors and leads the terminal operator through the correction balancing process, the vendor said.

The software package is available for between $40,000 and $48,000, depending upon options selected, the vendor said. Further information about the package may be obtained from MSA at its headquarters at 3445 Peachtree Road, N.E., Atlanta, Ga. 30326.

'Roscoe' Update in Beta Test

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) has announced Release 5.1 of Roscoe, its on-line programming system for IBM OS/VS environments.

Roscoe 5.1 currently is in Beta testing and is scheduled for general distribution later this summer. It reportedly will enable users to split IBM 3270 terminal screens into two logical screens with Roscoe commands and facilities available in each.

The users will be able to change the size of each presentation area, swap the two areas, or end one of the logical sessions at any time, ADR said.

Another feature reportedly allows users to enter special, shorthand editing commands in the execution area of the terminal screen. A new format will leave the sequence number field unprotected, the vendor said, so users can enter these commands while using the IBM 3270 keys to edit the displayed data.

The Dialog Management Facility (DMF) is said to aid the development of panel-driven applications written in Roscoe's Programming Facility. DMF will provide automated panel construction, automated input validation, automated sequencing control and maintenance, the vendor said.

The permanent license price for non-MVS Roscoe is $34,000 and $38,500 for MVS Roscoe, ADR said from Rt. 206 and Orchard Road, CN-8, Princeton, N.J. 08540.

Program Generator Fits IBM Systems

BEDFORD, Mass. — Continental Resources, Inc. has entered the software market with its introduction of Act/1, an on-line application program generator for IBM 370, 4300 and 30 series and plug-compatible equipment.

Designed to provide integrated development and preserve functional integrity during maintenance, Act/1 reportedly is a productivity tool used to manage the on-line application throughout its life cycle.

Act/1 is intended to reduce program design time and thereby reduce communications problems between developers and end users, the vendor said. The software is priced between $13,400 and $49,800, depending on the configuration, the vendor said from 175 Middlesex Tnpk., Bedford, Mass. 01730.

'Mac-Pac/HP' Now on Series 44

IRVINE, Calif. — The Mac-Pac/HP manufacturing software from Far-West Data Systems, Inc. now runs on the Hewlett-Packard Co. HP 3000 Series 44 minicomputer as well as the HP 3000 Series II.

Mac-Pac/HP consists of 11 modules including MRP, shop floor control and product costing. The order entry and distribution system (DMS/HP) currently consists of order entry, billing and receivables with finished goods, inventory, purchasing and sales analysis to be made available later this year, the vendor said.

A third system, RDS/HP, is for the construction industry and offers project/job costing, general ledger, accounts payable, project management and financial modeling.

Manufacturing, accounting and order entry/distribution systems may be purchased and installed by module, with systems starting at $30,000, the firm said.

The Manufactuirng system is offered by both Far-West and Arthur Anderson & Co. and is fully supported by either firm, based on customer needs.

Far-West Data is located at 17841 Fitch Ave., Irvine, Calif. 92714.

Application Development Supported on IBM PCS

RALEIGH, N.C. — PCI Systems, Inc. has released a set of programs designed to improve application development productivity for users of IBM's Health Care Support/Patient Care System (PCS).

The four subsystems introduced are components of PCI's Patient Management System (Pmas), a hospital-wide information system that runs under both IBM OS and DOS operating systems.

They include Pmas/Action, a command interface, and Generalized Dynamic Display, an interactive, table-driven screen display facility said to replace the PL/1 programs needed to provide Dynamic Displays in a PCS environment.

Also included in Pmas are Generalized Output Processor, an interactive report writer that enables the user to select the output device best suited to the job and Mailbox, an on-line message center facility.

The Action and Generalized Dynamic Display modules are available for immediate delivery at a one-time license fee of $12,000 each. Generalized Output Processor and Mailbox will be available for general release in early 1982 from the vendor through P.O. Box 30098, Raleigh, N.C. 27622.

CDC, DEC Tops in T/S

(Continued from Page 49)

price changes and actual increases revealed by comparing benchmark costs for the two years.

Average processing unit increase announced by the vendors was 11.6%, RDC said. But the average increase between the two sets of 16 benchmark runs was 17.6% with RDC attributing the hidden 6% to pricing algorithm changes that are often buried from end-user view.

In addition to a detailed cost analysis of the 24 time-sharing vendors, the report provides an informational overview of each vendor in terms of facilities, support services and performance standards.

The overviews cover hardware, network, languages, application packages, external data bases, user-assistance, security precautions and backup/start-up procedures.

Available immediately, "Time-Sharing Decisions" costs $695 from RDC at 123 High Ridge Road, Stamford, Conn. 06905.

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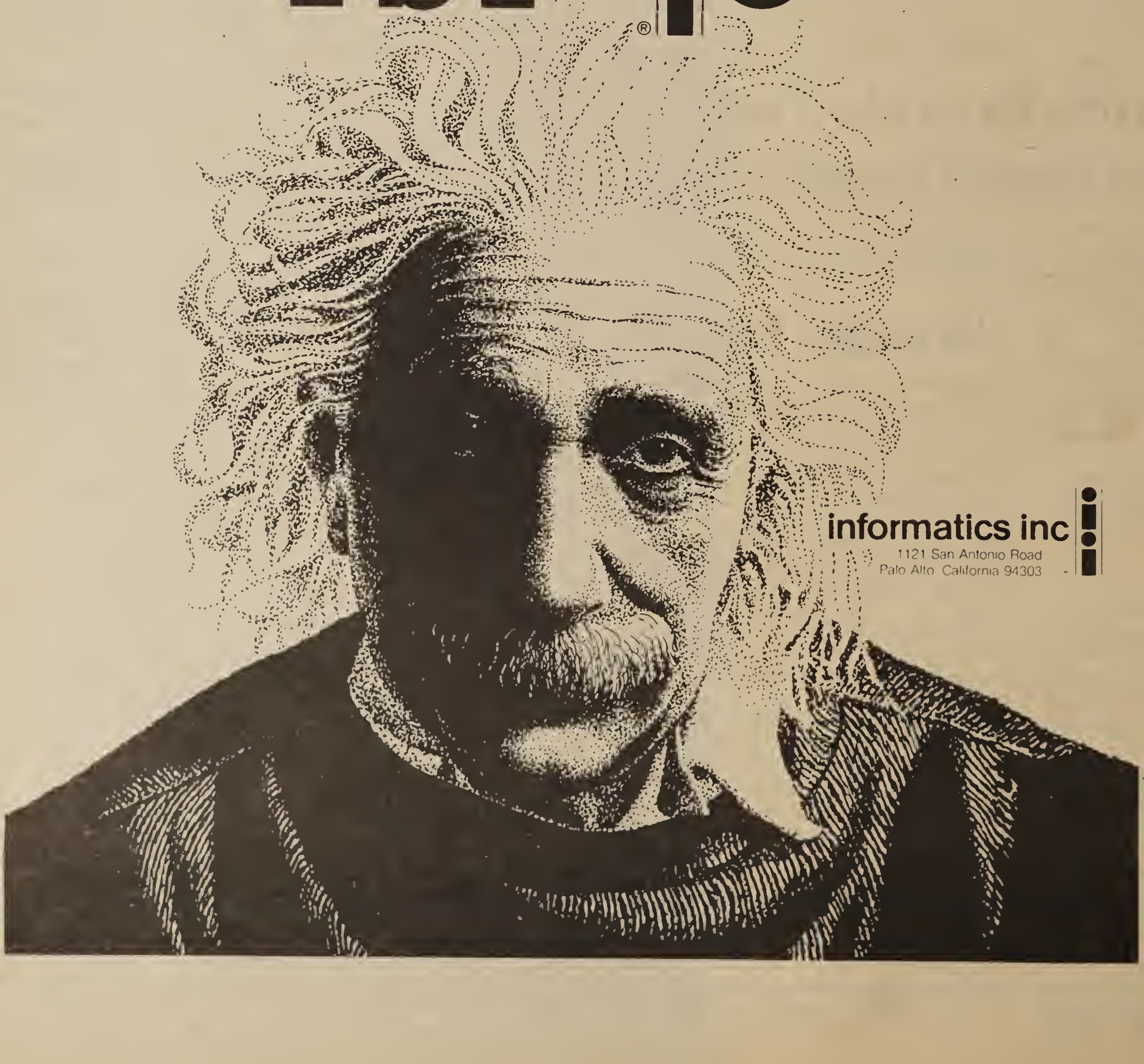

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Routine Speeds Data Input For IBM Users

OAKLAND, Calif. — Fastin, a generalized routine designed for fast input of data in IBM 370 and later generation systems operating under the OS, MVS and VM environments, was developed here by Prime Factors, Inc.

Fastin reportedly directly accesses peripheral input devices and pulls a user-defined number of bytes from any Qsam file. Partial records, complete records or even entire files can be accessed with a single subroutine call, the vendor said.

Input files may be fixed or variable length, undefined, blocked or unblocked and may reside on tape, disk or cards, according to Prime Factors.

Fastin is said to interface with Cobol, Fortran, PL/I, assembler and other languages. The software routine is available in object form for a one-time license fee of $750 from Prime Factors at 6529 Telegraph Ave., Oakland, Calif. 94609.

Service Aids CICS Users

RIVER EDGE, N.J. — On-Line Software International (OSI) has introduced a customized consulting service designed to assist IBM CICS users in the development of CICS systems standards, usage procedures and corresponding CICS user-reference manuals.

The CICS Standards Manual service is implemented by consultants working with clients on-site, and a manual is produced to give them common reference points about CICS in general, as well as a clear definition of installation operating standards.

After an initial work session, the consultants formulate a preliminary CICS manual. Following client review and revision of that draft, a final, customized CICS standards manual is prepared that defines what tasks are to be performed, who should perform them, how they are to be performed and why those standards were chosen.

The cost of the CICS Standards Manual service ranges from $14,000 to $18,500, depending on factors such as the size of the manual and the size of the client's installation.

On-Line Software International is headquartered at 65 Rt. 4 E., River Edge, N.J. 07661.

Business Package Runs on Wang VS

SEATTLE — A School District Business Application Software package that runs on Wang Laboratories, Inc.'s VS line of computers has been announced by Dynalogic, Inc.

The package includes on-line packages for payroll, purchasing, accounts payable, central stores and accounting and budgeting written in Cobol.

The software lists for $35,100, although modules may be purchased separately. Rental on a yearly basis is also available, the vendor said from 1836 Westlake Ave. N., Seattle, Wash. 98109.

Package Manages Workload For 370s, Plug-Compatibles

MENLO PARK, Calif. — The Institute for Software Engineering introduced the Workload Management System (WMS), a software package that is designed to control DP resources for users of IBM 370 and plug-compatible systems running under MVS.

WMS is written in SAS Institute, Inc.'s Statistical Analysis System programming language. The software package consists of programs, reports, analysis procedures, documentation and customized management support.

It is based on two software program products, the Workload Analyzer/1 and the I/O Analyzer/1. When used with WMS procedures, these tools reportedly supply management with control and planning information for characterizing workloads by resource usage and by work patterns.

They also provide for tracking of work load growth or change, comparing actual usage against equipment capacity, establishing the useful capacity of high-speed I/O configurations, spotting work load-capacity conflicts and providing data for forecasting and planning.

WMS is licensed for an annual fee of $24,000 for the first year and an annual renewal fee of $9,750 from the vendor at Suite 200, 535 Middlefield Road, Menlo Park, Calif. 94025.

Series/1 Gets Sales Package

NEW YORK — A sales and service package for IBM Series/1 minicomputers was developed here by Argos Computer Systems.

Called Charlie/1, the software is designed to provide functions for inventory tracking and control, automated billing, customer information maintenance and reporting, order entry, cash and over-the-counter sales, work orders and labor and noninventory billings. It can be configured from a $40,000 package to a $150,000 package capable of handling 99 geographically dispersed stations, the vendor said from 200 Madison Ave., New York, N.Y. 10016.

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For DEC Mini Users

Tool Generates Bug-Free Forms

AUSTIN, Texas — CRTForm, an automatic code-generation software package that reportedly creates bug-free forms for Digital Equipment Corp. minicomputer users at every level, was released here by Statcom Corp.

The CRTForm package consists of a form file manager, an input field-oriented screen editor and precompiled run-time modules. It contains a code generation section that reportedly is available to interface the program to Pascal, Fortran, Basic and Cobol languages.

The vendor said the system can be configured, without modification, to run on more than 95% of the terminals currently on the market.

CRTForm's forms manager maintains forms in random-access files. Its capabilities are said to include the ability to generate code that will interface to the run-time modules, copy a form within a file, rename a form or change form comments and test a newly created or revised form.

CRTForm runs on DEC minis in RT-11 and RSX-11M environments and is priced between $750 and $2,500. It also operates on microcomputers running under the CP/M operating system and is available for between $250 and $400, the vendor said.

Statcom Corp. is located at Suite 202, 5766 Balcones, Austin, Texas 78731.

Basic-11 Tool Gets Update

NORCROSS, Ga. — General Systems, Inc. is offering Release 3.0 of its business Basic-11 accounting system, which includes general ledger/financial reporting, accounts receivable, accounts payable and payroll modules.

Each of these modules may be run stand-alone or interfaced for posting to the general ledger system, the firm said. All programs are written in Basic-11 and will run on any Digital Equipment Corp. PDP-11 running RT-11, TSX or TSX-Plus operating systems.

The price for each package is $250 and all four may be purchased for $750. A manual for any of the modules may be ordered for $15, which will be deducted from future orders, according to the vendor. More information is available from the firm at 1101 Noble Forest Drive, Norcross, Ga. 30092.

T/S Package Backs Business With Multisites

DENVER — Pannell Kerr Forster (PFK) has developed a software product designed for the management of multiple-location businesses in any industry over the PFK Dataline time-sharing network.

Dataline, an on-line, interactive, data base software package connects users for computer input through push-button telephones at branch locations. Any alphabetic or numeric information can be collected and stored, the vendor said.

A printer at the home office produces operating and management reports used to monitor cash flow, sales and inventory.

The cost of using Dataline includes a minimum of $4,000 for installation of the service and training of personnel, an approximate $2 charge per use per branch outlet and additional fees for necessary customization.

PFK is located at 400 Denver Club Building, 518 17th St., Denver, Colo. 80202.

DEC Users Restricted To Limited Program Set

BEDFORD, Mass. — A utility that restricts selected users of a Digital Equipment Corp. processor to a limited set of authorized programs has been introduced by Clyde Digital Systems, Inc.

When a user has logged on and entered a secondary password, Lock presents a menu of authorized programs. The user can only run the tasks shown in the menu or log off the system. Any attempt to abort a job or break out of the restricted set of tasks leads to a presentation of the menu once again, according to the vendor.

The utility also records information about each job run and puts it into a secured report file, the vendor said.

Offered for the DEC PDP-11 under RSTS and currently being implemented on the VAX system, the package costs $1,800, the vendor said. More information is available from Clyde Digital Systems, P.O. Box 348, Bedford, Mass. 01730.

Enhanced 'Lawtime' Runs Accounting on Datapoints

ALTAMONTE SPRINGS, Fla. — Systems & Software Associates has released Lawtime II, an enhanced version of its original software package for law firms with Datapoint Corp. systems.

Lawtime II is an integrated system designed for law firms with five to 100 attorneys, a vendor spokesman said.

The modules in the package include time accounting, client cost advances, billing, cash receipting and accounts receivable, general ledger and payroll, according to the vendor.

Optional software includes a docket control/reminder system, check writing/bank reconciliation system and a loan amortization system, the vendor said.

Lawtime II will run on any Datapoint system in an on-line, real-time interactive mode. It will also operate in a "shared logic," multiprocessing environment, according to the firm.

Lawtime II features the ability to handle large law firms, new capabilities with regard to alternate billing rates, faster program execution with less disk storage and more management reports, according to a vendor spokesman.

It can also be integrated to word processing and telephone system functions, the firm said.

Lawtime II costs between $14,750 for a medium-size law firm to $30,000 for a large law firm of 50 or more attorneys, the vendor said. More information is available from the firm at 307 Whooping Loop, Altamonte Springs, Fla. 32701.

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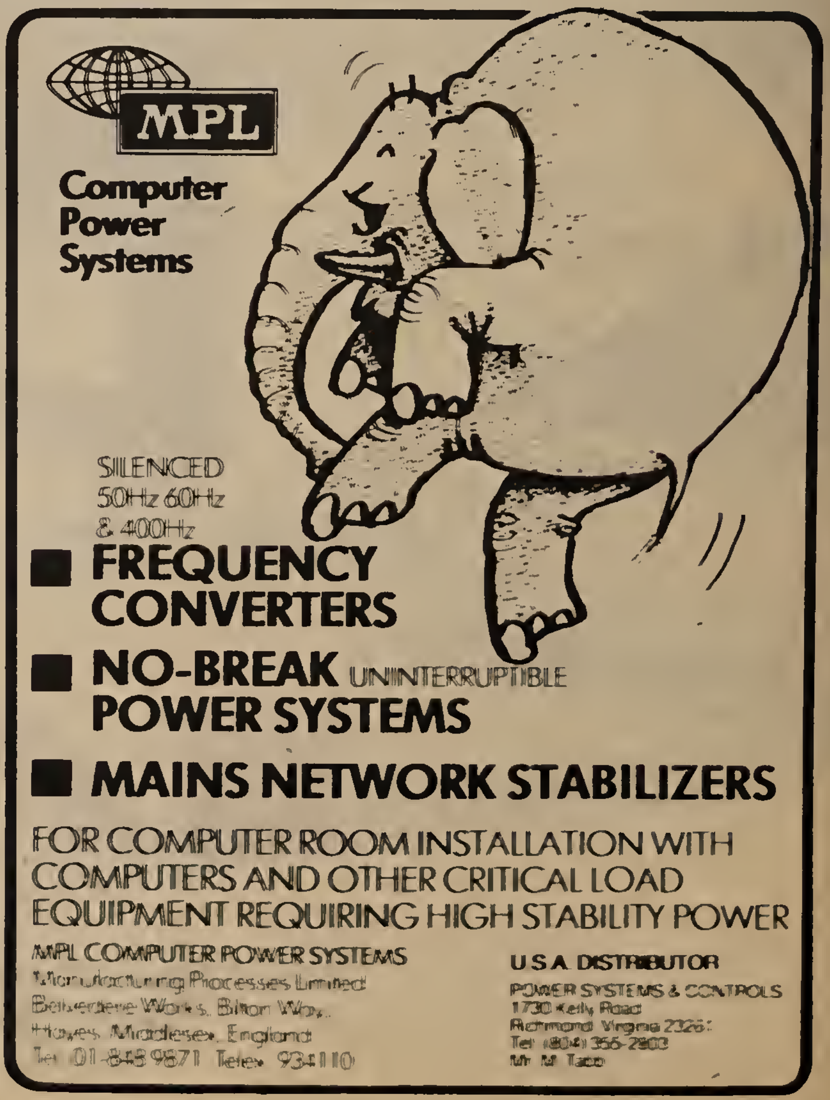

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'DP Cost' Aids Scheduling Of System/34 Operations

BELLEVUE, Wash. — The Job Cost Accounting System (DPCost), a software package introduced here by Jessup, Mallette & McBroom, Inc., reportedly provides tools for establishing scheduling requirements to maintain operating standards on IBM System/34 minicomputers.

DPCost reportedly features CPU and print time by work station, user ID, job name and two-digit application code. CPU and print cost/min also may be viewed to see the actual cost of each job, workstation, user or application, the vendor said.

A 12-month history is maintained for CPU and print time to enable users to view peak periods throughout the year.

Other features of DPCost are reports on daily usage, user names, job names and workstation and application analysis. Also included are on-line inquiries for workstation, job name, application and user analysis, the vendor said.

DPCost is priced at $250 from Jessup, Mallette & McBroom at 1810 116th N.E., Bellevue, Wash. 98005.

Package Hikes System/34 Jobs

BROOKFIELD, Wis. — Custom Design Systems, Inc. announced the Second Job Queue Feature software package for IBM System/34 users that was designed to increase the number of jobs being run on the system while decreasing the number of workstations required to process them.

The Second Job Queue Feature includes features that reportedly enable the user to display the job queue status, cancel all jobs or an individual job that currently is in the job queue, change the position or priority of a job, stop and start the job queue and place a job in the queue on a time-request basis, according to Custom Design.

The Second Job Queue Feature is priced at $450, Custom Design Systems, Inc. said from 12557 W. Burleigh, Brookfield, Wis. 53005.

System/34 Gets Library Support

LITTLE ROCK, Ark.— Arkansas Systems, Inc. is now offering User Library Analysis (ULA) and backup for the IBM System/34.

ULA provides directory analysis of all libraries on disk, dynamically saving all user libraries to diskettes in magazines and minimizing the number of diskettes, the firm said.

The directory analysis includes library name, blocks allocated, directory sectors allocated, number of directory entries used, number of directory entries available, percentage of library used, minimum number of blocks required, number of unused blocks and number of two-dimensional diskettes required for backup. ULA costs $65 if diskette is needed and $58 if purchaser includes diskette, the vendor said from Suite 206, 8901 Kanis Road, Little Rock, Ark. 72205.

IBM Announces Shop Control System

WHITE PLAINS, N.Y. — IBM recently announced a shop floor control system for use with its 8100 Information System and 3640 magnetic terminals.

The IBM 8100/3640 Distributed Shop Floor Control System is available on a one-year lease for $345/mo, according to the vendor at 1133 Westchester Ave., White Plains, N.Y. 10604.

Package Assists Design, Documentation for System/34

HAMILTON, Ont. — Shaw Computer Consulting Services, Ltd. announced a package for IBM System/34 users that it claims assists the design and documentation of new systems as well as the documentation of existing systems.

The System Design and Documentation Aid (SDDA) reportedly includes an Online Data Dictionary, record layout generation and documentation, generation of RPGII I/O specifications, sample report generation and documentation, program and file dictionary and narrative, an on-line text editor and a constants and tables file subsystem, the vendor said.

All documentation is maintained on-line and is computer-printed to simplify maintenance, according to the vendor.

Standard Usage

SDDA reportedly enforces the discipline of standard field name usage in files and reports and the usage of standard record layouts.

The software package will be available for distribution on Aug. 1 and can be purchased for $1,400, which includes one copy of the code on an IBM two-dimensional diskette and one copy of the package documentation, the vendor said.

Shaw Computer Consulting Services, Ltd. is located at 225 Main St. W., Hamilton, Ont., L8P1J4.

ONLINE
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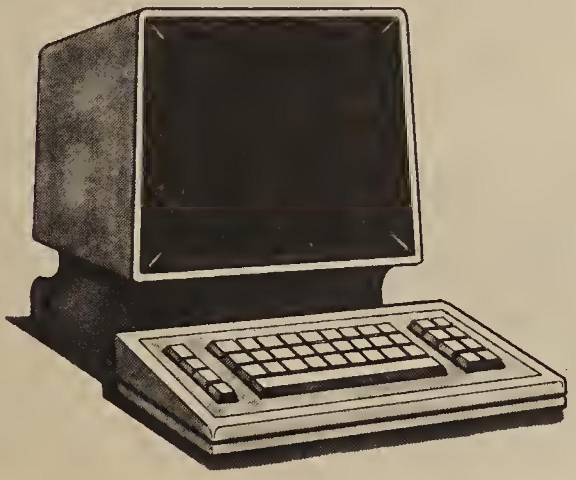

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Nixdorf Computer Introduces Report Writer for 8870 Systems

WALTHAM, Mass. — A Report Writer package for its 8870 computers was unveiled here by Nixdorf Computer Corp.

Designed for use by nonprogrammers, the Report Writer is said to enable direct communication with a Nixdorf 8870/1 or 8870/3 computer for sorting and ranking data.

It works with up to 13 files for producing a single report using up to five levels of totals. Printed reports are free-form with complete user flexibility for header, detail lines and page feed control, the vendor said.

Both local and remote workstations can generate their own programs and reports and phantom report processing permits the user to free the normal terminal for regular use.

The Report Writer is priced at $1,000 for the license fee plus a two-day installation and a training support charge of $800 from Nixdorf, headquartered at 300 Third Ave., Waltham, Mass. 02154.

'Job Stream Supervisor' Enhanced for System/34

JEFFERSON CITY, Mo. — An enhanced version of Software Systems, Inc.'s 5280 Job Stream Supervisor (JSS) is said to include support for an IBM System/34-like local data area.

Version 4.0 also reportedly features an option that allows a procedure to automatically execute upon loading and a command to communicate to a background partition. The sign-on display may be customized. The minimum memory required for the JSS has also been reduced, the vendor said.

The JSS is a memory-resident operating system for the IBM 5280 that facilitates the running of programs under menu and procedure control, the vendor said. Version 4.0 costs $560 from Software Systems, Inc., Box 1766, Jefferson City, Mo. 65102.

Burroughs Programs Protected

TOPANGA, Calif. — A system to protect Burroughs Corp. users from executing improper program versions has been announced by Rothe, Grant & Associates, Inc.

The Object Program Scanner (Obscan) is a parameter-driven generative system that can be tailored for the needs of a specific installation and is available on Burroughs medium-size systems.

Obscan costs $2,400 from Rothe, Grant & Associates, 1505 Brookings, Topanga, Calif. 90290.

Graphics Tool Out for Tyros

RADNOR, Pa. — A computer graphics system that reportedly allows non-DPers to produce charts and graphs is available on Sun Information Services Co.'s (SIS) remote computing network.

Sunchart is said to allow anyone to transform large amounts of business information into charts and graphs in black-and-white or color. The system can be automatically linked to the user's current computer files or to specialized data base management and financial modeling systems offered by SIS, according to the vendor.

Sunchart offers 10 chart formats, and the user may combine up to six different graphs on a single page. The system is available on SIS' IBM network under both the VM/CMS and MVS/TSO operating systems.

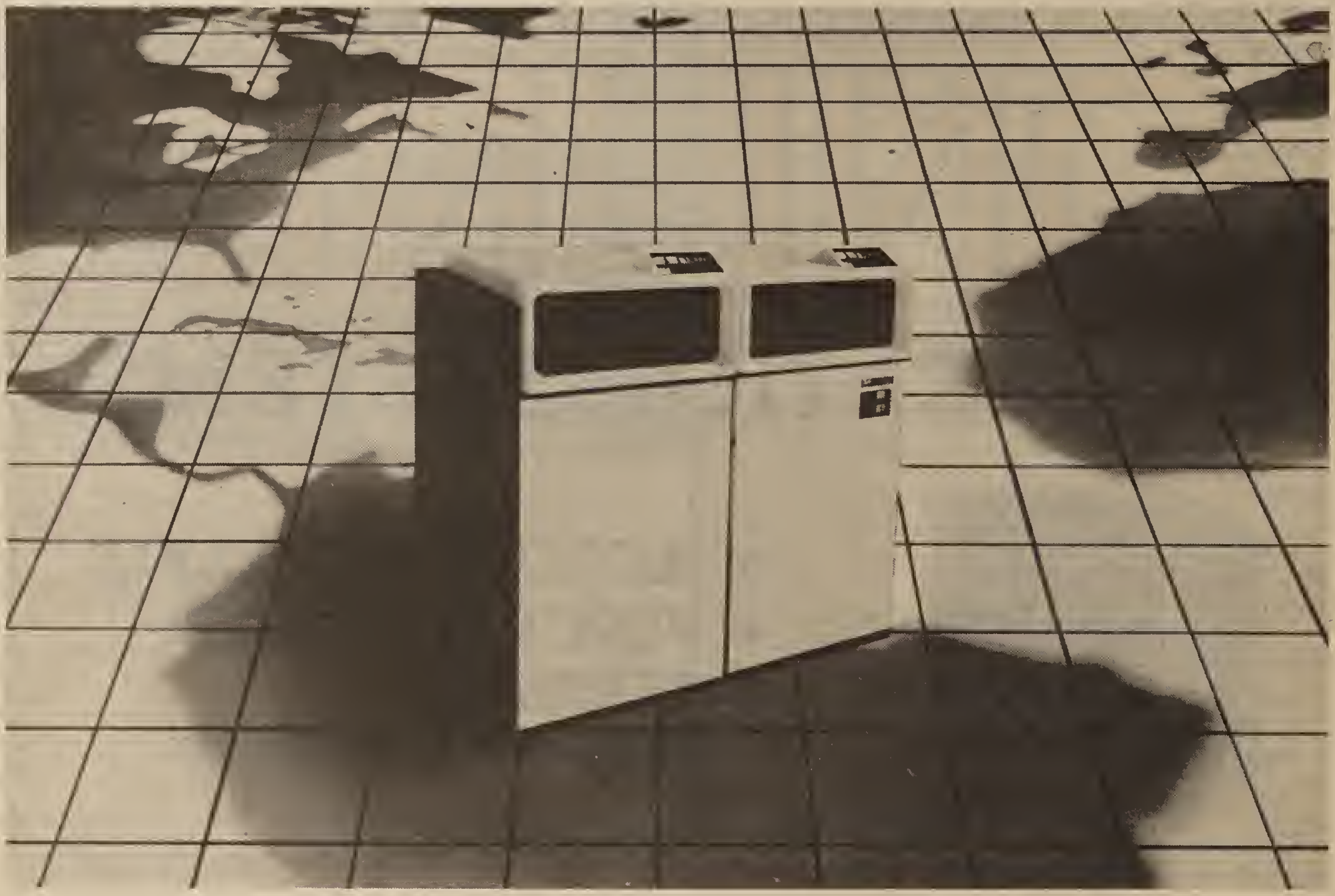
SIS is located at 280 King of Prussia Road, Radnor, Pa. 19087.

Geisco Unveils Graphics Tools

ROCKVILLE, Md. — Graphics software said to allow transformation of business data into charts and graphs has been announced by General Electric Information Services Co. (Geisco).

The line includes Tell-A-Graf, Disspla, Harvard Graphics Software, SAS/Graph, Plot II*** and a variety of Fortran subroutines. These packages are said to provide finance, sales, manufacturing, personnel, marketing and strategic planning graphics in two basic categories: production graphics and interactive graphics.

The service is billed on an as-used basis. A free brochure describing the service is available from the firm at 401 N. Washington St., Rockville, Md. 20850.



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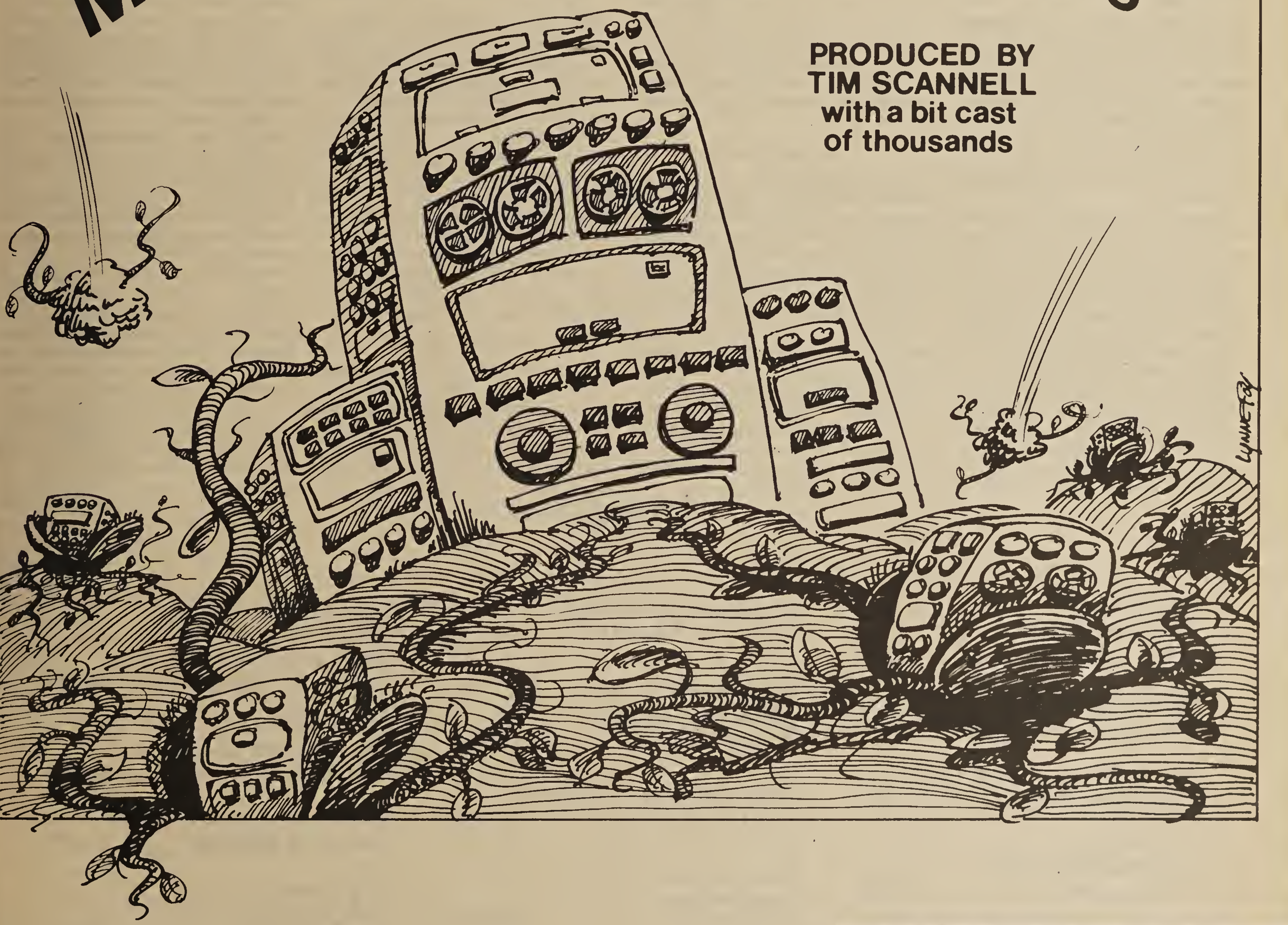
July 27, 1981

SPECIAL REPORT

INVASION OF THE MAINFRAME SNATCHERS

STARRING MINIS and SUPERMINIS



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with a bit cast
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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

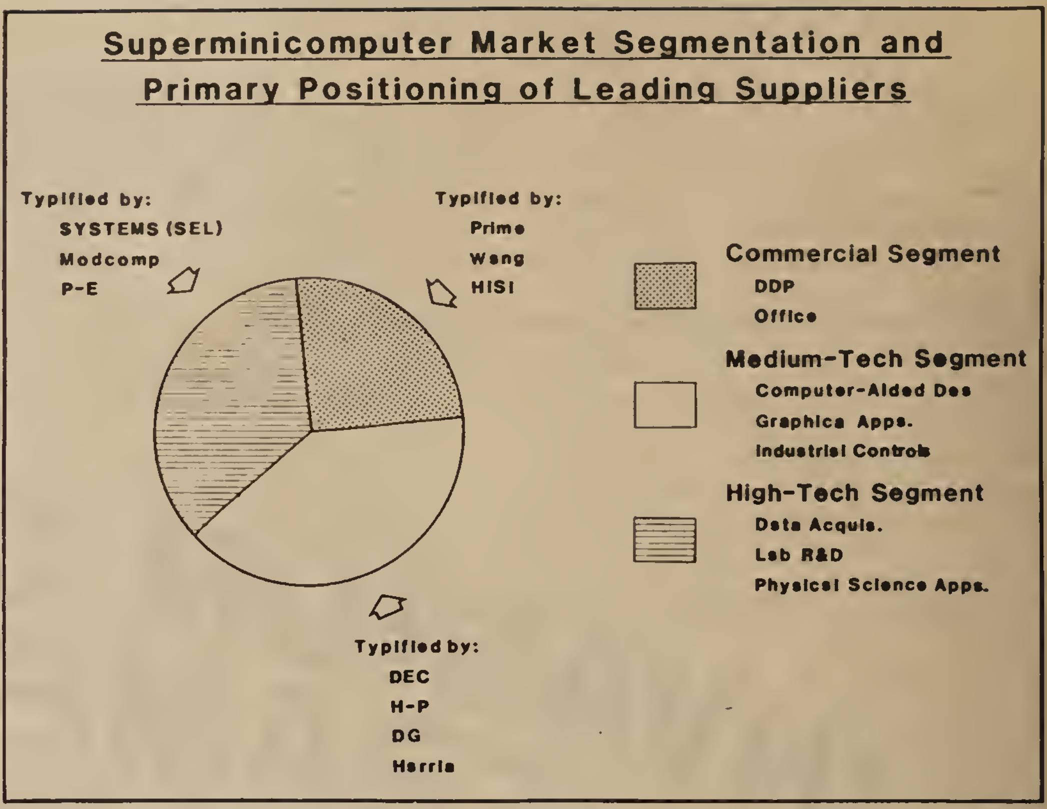
Comparative Market Strengths of Superminicomputer Manufacturers in 1981

KEY
1 - Strong
2 - Moderate
3 - Weak

	High-Tech (Lab & R&D)	Medium-Tech (Scientific & Engineering)	Commercial
32-Bit Superminis			
Apollo	3	1	3
BTI	3	2	1
Data General	2	1	2
Digital Equipment	1	1	1
Honeywell (HISI)	2	2	1
Perkin-Elmer	1	1	2
Prime	2	2	1
Systems	1	2	3
Wang	3	3	1
Other-Word-Length High Performance Superminis			
Harris	1	1	2
Hewlett-Packard	1	1	2
Modcomp	1	1	3
Tandem	3	2	1

IRD Chart

Superminicomputer Market Segmentation and Primary Positioning of Leading Suppliers



IRD Chart

IRD expects superminis to represent a $2 billion market by the end of the decade.

Superminis Seen Topping $300 Million in '81

NORWALK, Conn. — Superminis are hot. A market research firm here, International Resource Development, Inc. (IRD), said 1981 supermini shipments will top $300 million. That figure is expected to jump 60% to $480 million in 1982 and superminis will be a $2 billion market by the end of the decade, according to a recent report.

Although traditionally superminis have been sold as bare-bones hardware to be tailored and programmed by the user or systems house for a particular application, vendors now tend to provide more sophisticated programming tools and special-purpose I/O equipment for such applications as aerospace simulators, oil drilling analysis, process control and business transaction processing applications, according to the report.

"The current phenomenal growth in this market will not last forever," Edward O. Lanphier of the IRD research staff predicted. "Sooner or later the in-depth support of particular applications niches will soon become the deciding force in market leadership."

Supermini Leader

With almost 40% of the current market (in terms of the value of equipment installed), Digital Equipment Corp. with its VAX line is the current leader in 32-bit superminis. Runners-up are Perkin-Elmer Corp. (with 22%), SEL/Gould (17%) and Prime Computer, Inc.(16%).

The report predicted Hewlett-Packard Co. will announce another supermini later in 1981. The processor is currently being developed under the code name Vision. The Vision machine will be comparable in power to mid-range VAX equipment and will be configured as a desktop processor.

"A head-on competitive machine from IBM is not so likely," according to Lanphier, who said an IBM supermini product would be "too damaging" to IBM's 32-bit commercial offerings in the 4331 and 4341 series.

Data General Corp., which introduced its MV/8000 series of superminis last year, is reported to be readying a new supermini for introduction to the market later in 1981 or in 1982. The new product, referred to internally as the "foutainhead processor," is regarded by the IRD as a key element in Data General's growth strategy, the report said.

DG Acquisition?

Linked with the DG announcement is the possibility of an acquisition by Data General of one or more specialized systems vendors to provide DG with instant applications expertise. The report pointed to an effort by DG last year to acquire Megatek, a computer graphics system manufacturer, as an example of a potential short-cut to obtaining computergraphics software capability for DG's supermini series.

While the microcomputer and minicomputer suppliers are bracing themselves for an influx of new products from Japan, there seems to be little immediate prospect of severe Japanese competition in the supermini segment.

"Maybe the Japanese and European computer suppliers simply overlooked the potential of this market sector in their eagerness to ship large numbers of small business computers and traditional data processing systems," Lanphier said.

The IRD report, entitled "Superminicomputers in the 1980s," costs $985, the vendor said from 20 High St., Norwalk, Conn. 06851.

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Consider Function

What's a Mini? And When Do You Need One?

**By Raymond P. Wenig
And Gary Lee Kelley**
Special to CW

As the power of different computer systems expands, it is becoming more and more difficult to differentiate between a micro, mini, midi or mainframe machine. Consequently, it is getting harder to decide exactly when to use a minicomputer, whatever that term may mean.

Without a doubt, the technological differences between each of the system species is narrowing. In fact, it is probably easier to view computer equipment on a spectrum as opposed to specific groupings.

An appropriate analogy between mainframes and minicomputers might be the automobile, with full-size cars being the mainframe, mid-size cars the midi or supermini and compact cars being the minicomputers. So as not to slight anything in the automobile or computer world, subcompact cars could be analagous to microcomputers.

If the analogy is carried through, we see that the function of each automobile is the same — transportation. Just like in the computer environment, the functions of each computer, no matter what the size, are the processing of data. However, like computers, the differences between each of Detroit's and other locale's internal combustion creations lies in each automobile's power, cost, capacity and skills required of the operator.

Keeping the automobile analogy in mind, and realizing that you would not use a subcompact car to transport a six-person carpool, let us examine how a minicomputer system should be used.

Where to Use Mini

The place to use a minicomputer is in a transaction processing environment, utilizing localized sources of user input. The local use and manipulation of data, called interactive processing, on a timely basis further indicates the use of a minicomputer.

The data files should be of a small- to medium-size (1 million to 200 million characters), with only a minimal number of exceptions required on data steps. Communications to another logical unit is possible, although the processing should be logically contained.

One would not tend to use a minicomputer system if massive central files are required, if a large number of user terminals (more than 64) with heavy file reference traffic is indicated, or when security risks on shared data are high.

A minicomputer would not be an effective solution where there was a large number of concurrent applications (more than about four, although this is heavily dependent on the operating system).

A minicomputer should also be avoided when the application is primarily batch processing, when improved timeliness of response is of little or no value, or when anticipated processing includes large iterative programs. Unless, of course, the operator is using a specialized computational minicomputer system.

A mini would not be appropriate when the application is best suited for a microcomputer, such as in a single dedicated application sequence. Rather than deciding ahead of time the type of equipment we need, one can let the vendors recommend systems by using a well formulated request for proposal process.

First Phase

The first phase of an evaluation and selection process involves defining the requirements. Instead of listing the technical equipment requirements, define the functional requirements of the application in terms of inputs, outputs and file volumes. When indicated in a request for proposal format the burden of equipment and software recommendation is placed with the vendor. As part of the evaluation process, check back to your initial requirements and ensure that the vendor has indeed made a suitable recommendation.

If in doubt, be sure to visit an operational installation of the same size using an identical configuration to be convinced that the system is appropriate.

Wenig is president and Kelly is a senior consultant at International Management Services in Framingham, Mass.

Mini Characteristics

The only real way to tell if a product is a minicomputer is to sit down and evaluate its characteristics.

It is to be hoped the following list points out the major attributes of today's minicomputer systems:

- Low in price ($500 and up).
- Small in size (suitcase and up).
- Ownership commitment.
- Interactive processing.
- Small word size (SN-32 bits/word).
- Made up of components from multiple vendors.
- Performance limited by design.
- Shared I/O circuits.
- On-call maintenance.
- Minimal environmental requirements.
- User operated via data terminals.
- Limited software support from vendors.
- Located close to the end user(s).
- No dedicated computer console operator.
- Minimal bureaucracy needed.
- Modular structure.
- Discounted sales (on two or more).
- Limits on data file sizes.
- Wide range of peripheral devices available.
- Multitude of suppliers.
- Shorter physical and operational life cycle.
- Integrated into existing personnel operations.
- Requires most data center operational functions.

In short, if the product meets most of the above characteristics it is a *minicomputer.*

WHEN TO USE A MINICOMPUTER

APPLICATION KEY	MICROCOMPUTER	MINICOMPUTER	MAXICOMPUTER
	8 - 16 BIT WORD SERIAL PROCESSING SINGLE BUS SLOW I/O NO SUPPORT CIRCUITRY	16-32 BIT WORD OVERLAPPED PROCESSING LIMITED BUS STRUCTURE MEDIUM SPEED I/O LIMITED MEMORY "SPECIAL SUPPORT CIRCUITRY"	32-64 BIT WORD PARALLEL PROCESSING HIGH SPEED I/O LARGE MEMORY SUPPORT CIRCUITRY
DEDICATED CONTROL			
SLOW EVENTS	X		
FAST EVENTS	X	X	
INTERACTIVE PROCESSING			
MACHINES	X	X	
PEOPLE		X	
INFORMATION PROCESSING			
LOGGING	X	X	
FILE REFERENCE PROCESSING			X
TRANSACTION PROCESSING		X	
INQUIRY REQUESTS	X	X	
FORMAT; FIELD VALIDATION	X	X	
TERMINAL SUPPORT (1)	X	X	
to (16)		X	
more than (16)		X	X
REPORT EXTRACTING	X	X	
EDITING	X	X	
FILES to 1 million char.	X	X	
1-200 million char.		X	
above 200 million char.			X
LOCAL DATA BASES		X	
GLOBAL DATA BASES			X
FULL FILE EXTRACTION			X
GLOBAL TERMINAL SUPPORT			X
MAJOR COMPUTING			X
LOW COST COMPUTING	X	X	
NUMERIC ACCURACY			X
USER PROXIMITY	X	X	
GEOGRAPHIC SEPARATION		no - except Dist. Proc.	

When to Use a Minicomputer

Variables Actually 'Qualifiers'

Distinction Helpful for Minis, Mainframes

Special to CW

Managers, programmers and observers in the data processing field have a basic urge to label and categorize everything, including computers. So it goes without saying that a definitive minicomputer/mainframe distinction is both desirable and helpful.

When considering the number of variables in machine architectures and performance, it becomes obvious that these same variables are mostly qualifiers, not components of a definition that can segregate minis from mainframes. Further, the time frame is important.

This report was prepared by David Anthony, project editor of Auerbach's Computer Technology Reports; Thomas O'Connell, associate editor covering general-purpose minicomputers; and Earle Spamer, assistant editor of computer systems.

There certainly are many DP personnel who can recall the oohs and ahs of the IBM 1401, a venerable mainframe of its day. But who among us would still rank the 1401 as a mainframe in performance? A dinosaur today, the 1401 might be architecturally a mainframe, but couldn't hold a candle to today's minis. And today's mainframes are certain to be outshone by the machines of tomorrow.

Computers traditionally have required extremely technical people to operate and maintain the machines and have required very special physical environments. But the tides in these oceans are changing.

Improvements in software now enable nontechnical people to easily interface with computers, and even a knowledge of typing is no longer essential for the users of some machines. Many machines now can operate in a conventionally air-conditioned room off a common power line.

Drawing the Line

Manufacturers of minicomputers tend to offer packaged configurations for minis, while mainframes are usually sold unbundled. This observation holds true for the most part, but is hardly a satisfactory definition of minis and mainframes, as this is purely a vendor-subjective sales tool.

Memory capacities seem to conveniently group computers into categories. We have noted that microcomputers can configure up to 512K bytes of memory, minis to 4M bytes, superminis to 8M bytes and mainframes to 32M bytes and beyond. These figures are generalizations, but appear to be accurate.

Memory and CPU speeds could be good distinguishers between minis and mainframes if there did not exist so much overlap in the ranges of these figures. However, the mini/mainframe internal speed distinction is put into perspective when one realizes that minis are usually more limited by memory capacities and data access widths than are mainframes.

I/O configurations are widely variable on minis and mainframes alike, and flexibility of use is mandatory. Generally, minis are not designed to be distributed processing hosts, but make fine interactive machines. Mainframes, on the other hand, are not usually interactive, but make good batch machines and network hosts. I/O channels and communications lines also vary within mini and mainframe ranges and no simple categorization is possible. Here again, machine design is a key factor.

Price ranges are commonly used as a mini/mainframe delimiter. The line often falls in the neighborhood of $200,000. Remember, though, that prices are unreliable and subject to technological advances, national and world economies and marketing competition. With the stroke of a single price change, today's mainframe can be tomorrow's mini.

The closest thing to a bottom line is data structure. Generally, the larger the machine, the longer the word length. Conventionally, minis are 16-bit machines, while mainframes are 32-bit and up. Many minis have 32-bit word lengths and a few have 24-bit lengths, but the qualifier is memory access width and cycle time.

Even though a mini might use the same word length as a mainframe,

(Continued on SR/10)

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Especially in Past 2½ Years

Micro, Mini or Mainframe? Confusion Persists

By David Zeller
Special to CW

Minicomputers have been popular for the past seven years. The main reasons for their popularity are their size, efficiency, power and cost effectiveness.

However, especially in the past two and a half years, varied options of minicomputers appeared and the data processing professional as well as the consumer have reason to question just what is a minicomputer.

Why the name confusion between the micro, mini and mainframe machines? Well, the problem really didn't begin because minis grew larger. The problem first began with the introduction and later the proliferation of the microcomputer. A need arose to distinguish micros from minis.

A micro has smaller memory requirements and lower upper limits although many micros are expanding rapidly into the domain of the minicomputer. The microcomputer is designed using an 8-bit architecture vs. the 16-bit architecture of the minicomputer.

The micro functions well in the hobby or commercial modes with no printer, for example, and with one CRT terminal. Hence the micro is a smaller machine with fewer peripherals, in the main, than the mini.

After the micro boom, the mainframes began to scale down somewhat, making the line between minicomputer and low-end mainframe very slight. Hence the term supermini, which sort of distinguishes the upper limit of minicomputers from the low-end mainframe machine.

When the minicomputer first came out there was no doubt as to its appellation. It had a 16-bit architecture, was smaller than conventional mainframes, more or less required no special environmental conditions and was extremely easy to use.

Four Components

Four basic components constitute a minicomputer:

- Memory.
- Storage.
- CRT (cathode ray tube) terminal(s).
- Printer(s).

Memory is usually expressed in K bytes or thousands of bytes or characters of memory available. Storage capacity is similarly expressed in K bytes or M bytes of storage available.

An important consideration in evaluating a potential minicomputer is the upgradability or expandability of both memory and storage. The major determinant of whether a computer falls into the classification of being a minicomputer is its memory. An acceptable range would be 48K- to 1M bytes, although even within this range we could call a computer a mini or supermini.

CRT terminals are used for I/O functions in the course of data entry and for various inquiry functions. The maximum number of CRT terminals possible for each system is specified by the manufacturer, but above four CRT terminals on an average minicomputer system usually causes degradation in normal operations. Again, this is dependent on the type of minicomputer, its operating system and the programs being executed.

Larger systems, and those in a distributed DP environment, function better with a greater number of multiusers. Coupled with communications capabilities, they expand the uses of the minicomputer.

Printers are used to print output forms and reports. The speed required is a function of the anticipated daily volume of outputs and the average number of print positions desired. If printers are required in a remote mode, as in over a phone link, demonstrated test results should be reviewed to insure the end user that the equipment and software will perform at the rated speeds.

Popularity Gain

After its initial introduction into the commercial marketplace, the minicomputer rapidly gained popularity and overall sales rose due to its marked compatibility in solving problems associated with medium-size businesses.

People often mistakenly compare a company's annual sales figures to its need to automate. Nothing could be further from the truth. Whether a company or division turns six to 10 to $20 million per year or greater or $400,000 per year is not the main index of automation needs.

It is the paperwork burden bottleneck that needs alleviating, or

(Continued on SR/10)

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Digital Equipment Corp. — Manufacturing Software

DIBOL-11 packages for PDP-11s and LSI-11s:
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☐ Customer Order Processing
☐ Report Writer
☐ Inventory Management
☐ Shop Floor Control
☐ Job Costing

Data General Corp. — Accounting Software

Interactive COBOL packages:
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☐ Order Entry/Billing
☐ Accounts Payable
☐ Payroll
☐ General Ledger
☐ Accountants' Client Write-Up

Multi-User Extended BASIC Packages for DG's microNOVA™, NOVA® and Eclipse®
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☐ General Ledger

Wang Laboratories — Accounting Software

Interactive COBOL for the VS series:
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☐ Order Entry/Billing
☐ Accounts Payable
☐ Payroll
☐ General Ledger

Texas Instruments — Accounting Software

ANSI '74 COBOL for the DS990 series:
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*These packages are currently in development. Inquire for detailed information regarding completion schedules.

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Economy Forces Reductions

32-Bit Mini Becomes Hot Topic Among Users

By Fred Mascarenhas
Special to CW

To the everyday user, the bits and bytes of the various types of computers are of little consequence. The best computer is the one that gets the job done with the least risk and at an economical cost.

However, in days gone by, the large and presumably sophisticated user probably would not have been caught dead with anything other than a mainframe. Simply because minicomputers back then, while cheap, lacked many of the system facilities and software tools of the larger machines.

Now, with the recession and the high cost of borrowed capital, the user has to reeducate himself into thinking smaller. Or at least cheaper. All of a sudden, everybody is talking about 32-bit minicomputers, more fondly known as the superminis.

But, what are they? And how do they compare to 16-bit minicomputers and the more traditional mainframes? For a start, a supermini has much more in common with a mainframe than with a 16-bit mini since they both have a word length of 32 bits. A 32-bit word allows very large memory addressing, which is not possible on a 16-bit machine without some sort of convoluted memory management technique that uses CPU cycles.

The 32-bit word also allows the definition of more complex instructions, hence allowing more work to be accomplished per instruction and more quickly. Arithmetic calculations, for example, can be accomplished in fewer steps and with greater accuracy. I/O bandwidth is also greatly improved.

So there is a clear difference between 16- and 32-bit machines. But what is the difference between a 32-bit supermini and a mainframe? Absolutely nothing in pure hardware

(Continued on SR/10)

	Supermini	Mainframe
	Perkin-Elmer 3240	IBM 4341-1
Word Length	32 Bits	32 Bits
I/O Bandwidth	40M Byte/Sec	9M Byte/Sec
Number of Registers	128	16
Maximum Memory	16M Bytes	4M Bytes
Cache	8K Bytes	8K Bytes
Microcoded	Yes	Yes
User Microcode Option	Yes	No
Front-End Processor	Yes — Dios	Yes — 8704/5
Performance Ratio	1.5	1
Cost	$150,000 - 200,000	$300,000 - 400,000

Hardware

	Supermini	Mainframe
	Perkin-Elmer 3240	IBM 4341
Operating System	OS/32, Unix	DOS/VSE, VSI, MVS, VM
Transaction Processing Monitor	Reliance	CICS
On-Line Development	Multiterminal Monitor (MTM)	VM/CMS
Cobol, Fortran Assembler, Pascal, RPG-II, PL/1, Coral 66	All Except PL/1	All Except Pascal and Coral 66

Software

A Short History Of Superminis

In the beginning, all mainframes were traditionally 32-bit computers and minicomputers were of the 16-bit persuasion. Since minicomputers originated from process control machines, they had a real-time heritage.

In the old days, memory was expensive, so the first minicomputers had a maximum of 64K bytes of memory that could be directly addressed. Then, two things happened: First, small user applications started getting bigger, which meant the users needed bigger and more versatile machines. Second, memory prices started falling from their place on the DP mount.

At this point, most minicomputer manufacturers stuck with the 16-bit word size, but introduced complicated memory addressing techniques to allow more than 64K bytes to be addressed.

PE Breaks Barrier

In 1973, Perkin-Elmer Corp. broke the 16-bit minicomputer barrier and designed a 32-bit machine that could directly address large memory sizes. However, to keep the price down to that of a minicomputer, the system incorporated a less expensive 16-bit processor microcoded to look like a 32-bit processor.

The computer, called the 7/32, had a 32-bit operating system, ran all of its assembler instructions in a 32-bit mode, and had compilers that produced 32-bit object code. But, did it run faster than any of its traditional 16-bit peers? Unfortunately, not always.

The first true 32-bit computer appeared in 1975, again produced by Perkin-Elmer. The Model 8/32, although more expensive than the 7/32 and 16-bit computers, was rated as fast as an IBM 370/158 in scientific applications.

Three years later, in 1978, Digital Equipment Corp. brought out its version of the 32-bit minicomputer — the VAX-11/780. However, only the system's operating system and Fortran compilers were 32-bit. Since converting programs in the PDP-11 range to 32-bit would involve a major conversion effort, the VAX often emulated the PDP-11 for some compilers and applications software. Today, most of the machine's compilers are 32-bit.

Currently, the 32-bit word size is a standard, whether mini or mainframe. So, the key to the 32-bit systems' growth lies not in the hardware, but in the software and specific user requirements.

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32-Bit Mini Now a Hot Topic Among Users

(Continued from SR/7)

terms. About the only distinguishing feature of superminis is that they are produced by the traditional minicomputer manufacturers.

Because of their heritage, superminis tend to be a lot better at real-time work than mainframes that have been traditionally batch oriented. And real-time work is now the wave of the future.

Let's look at one supermini, the Perkin-Elmer Corp. 3240, and compare it to a current mainframe, the IBM 4341.

From a hardware point of view, the 3240 is either equal to or better than IBM's 4341-1. The minicomputer has a lot more registers than the mainframe and a high I/O bandwidth, which greatly enhances on-line and transaction chores since fewer context switches are necessary.

Unlike most superminicomputers that are deficient in software facilities and run in some sort of 16-bit emulation mode, the 3240 uses 32-bit software and has software facilities comparable to those of the IBM machine.

The IBM computer does have a greater variety of operating systems, but this is not necessarily a benefit since expensive conversions are involved in changing horses. Ask anybody who has converted to MVS. And the IBM operating systems have a batch heritage. CICS, the transaction monitor, for example, was written as an add-on package out in the field although it is now centrally maintained by IBM.

On the other hand, Perkin-Elmer's transaction monitor was designed as a totally integrated on-line system and synthesizes easily with the intrinsic real-time capabilities of the 3240.

While this may sound a lot like a sales pitch, the basic message is clear: When considering mainframes, a user should also consider the superminis.

Basically, there is nothing today that separates the two, unless of course the user is looking for the raw power of an Amdahl Corp. or Cray machine.

Mascarenhas is the product marketing manager for Perkin-Elmer Data Systems Ltd. in England.

Is It a Micro, Mini or Mainframe?

(Continued from SR/6)

the requirement for more and better management information that point to accurate and strong DP needs.

A survey and analysis of the overall automation effort followed by a detailed fact gathering of each proposed application area, with a summary of current and future transaction volumes, lead one toward understanding the areas to be computerized and subsequently a study of the families of computers that can meet those needs along with supporting software.

It really matters little what hardware a prospective installation chooses. It is the software that really counts. First, look for standard packages either supplied by the equipment manufacturer, sold by a software house or available from an OEM. If possible, request testimonials from installed users.

Keeping software standard makes for an easier installation, using proven and workable programs. It also allows you to evaluate the extent of necessary system modifications and the ability to try to keep them to a minimum.

Consequently, training your users and operators follows a prescribed method, constructing your data base and master files is done according to a plan, and going live becomes less burdensome.

So, it is a software game. That is what will make or break your installation. And now there is a lot more workable and reasonably priced software available versus what we had back in 1975.

Zeller has more than 15 years experience in data processing. He is presently head of Zeller Communications, Inc. in New York and is a minicomputer lecturer for the Association for Computing Machinery.

Label Useful for Mini, Mainframe

(Continued from SR/4)

the mainframe will have a higher per cycle ratio of speed to data access. That is, a mainframe using the same data structure as a mini can have a higher internal processing rate by moving more data through the CPU and memory during a shorter cycle time than the mini.

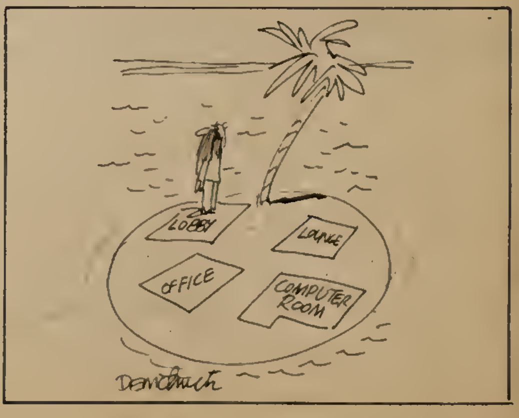
Dimmer Distinction

There is an even dimmer distinction between minis, superminis and mainframes. The same set of variables applies to the middle group as to the others, with the same cautions, but less clearly defined. This is readily observed in the marketplace, where a supermini can be identified by the machines against which it is designed to compete.

Priced in the $100,000 to $200,000 range, together with its level of technological sophistication, the supermini competes with minis or mainframes, depending on the vendor's marketing strategy. Thus, a machine in this category is more accurately a supermini or an economical mainframe.

Finally, several specific criteria must be considered in order to categorize a machine as a mini, supermini or mainframe. The three categories are comprised of the following recognizable criteria:

- Minis are 16-bit machines with 512K bytes to 4M bytes of memory, with purchase prices to about $100,000.
- Superminis are 16- to 32-bit machines with 4M-to-8M bytes of memory, with purchase prices to about $200,000, but whose data access widths and cycle times are not as high as those for equivalently configured mainframes.
- Mainframes are 32-bit large machines with more than 8M bytes of memory, with purchase prices exceeding $200,000.



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Provides Students With Job Skills

Minicomputer Used as Training Tool in Voc Ed

By Terence C. Conaty
Special to CW

LINDENHURST, N.Y. — The small, sophisticated, versatile minicomputer is fast becoming a veritable giant in the field of vocational education.

At most institutions, minicomputers are not only used as tools for developing computer operational and programming skills, but are used heavily for administrative support and word processing.

The L.A. Wilson Technological Center here is an area vocational school that relies on minicomputers for both secondary and adult education classes. The center is part of the statewide Board of Cooperative Educational Services (Boces) program and offers such DP courses as basic programming, computer operations, data entry and WP.

Secondary students are bused to the center and attend sessions three hours a day over a period of two years. The student population consists primarily of juniors and seniors who must concurrently complete their academic programs at the regular high school.

Afternoon and evening programs are presently designed for adult education. However, it is expected that the future will see both secondary and adult training being conducted during the daytime period.

Programming Languages

Currently, students are programming in Cobol, RPG and Basic using on-line CRT terminals for entering, compiling and debugging. Stand-alone diskette-based minicomputer systems are used for coding and program input preparation.

The school has an older Honeywell, Inc. tape/disk computer system and recently acquired an IBM System/34 minicomputer.

The IBM mini is used as a tool for developing computer operational skills. The exposure to the operating system and the utilization of procedures and control language provides the student with a depth of understanding that cannot come out of a textbook.

Documentation and controls associated with the operation of the mini are an integral part of the operations module. By responding to error and conditional displays, modifying job queries and print spool files, accessing and evaluating session and workstation status displays, that invaluable insight necessary for efficient operation is provided.

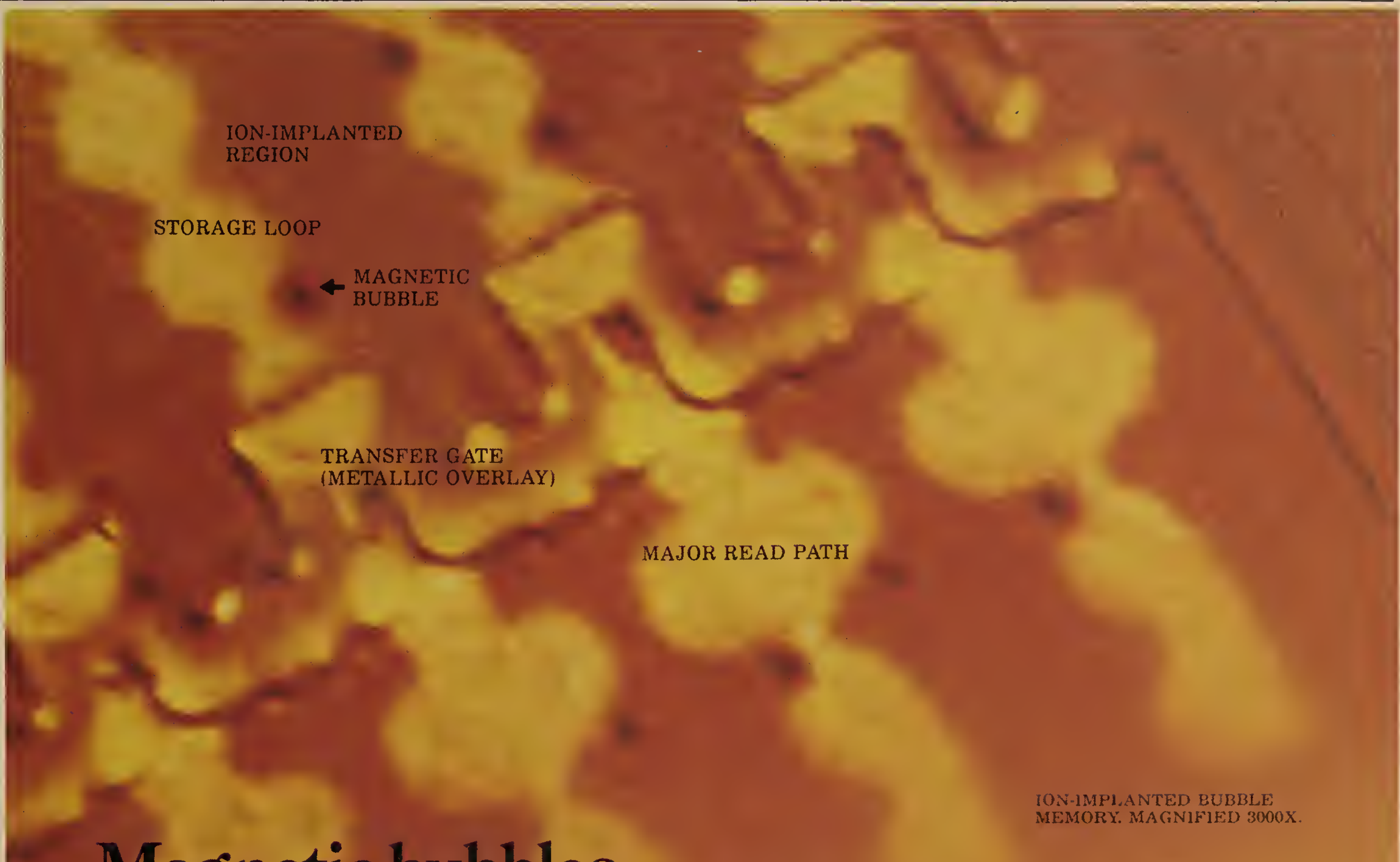
While a number of the students go on to higher education, those entering the field following graduation from high school are well prepared for the various entry-level computer operations positions.

Data entry skills are readily developed using the minicomputer system. Both typewriter and data entry type keyboards are used to develop the necessary accuracy and speed that leads to a productive entry-level operator.

In addition to developing keying skills, the keying of various business applications provides a trainee with exposure to many applications that would be found in a standard data entry environment.

Utilizing the relatively inexpensive business applications packages available, the possibly catastrophic results of keying errors are easily demonstrated to the students by having them review and evaluate the hard-copy out-

(Continued on SR/16)



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We're also studying how to manipulate bubbles by means of two wafer-thin conducting sheets instead of a pair of external coils. With this technique, we'll be able to cut the overall size of bubble devices by a third, move the bubbles 10 times faster, and also put far more bubbles on a chip than in today's commercial devices.

A group of Bell Labs scientists and engineers working on magnetic bubble technology holds over 150 patents in the field. About half of them have been awarded to Andrew H. Bobeck, a co-holder of the basic patent for the 1966 invention. Among our inventions:

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- Method of growing epitaxial garnet films from a supercooled solution
- Basic technology for device manufacture
- Ion implant method of propagating bubbles
- Dual-conductor sheet method of propagating bubbles

In the Bell System, bubble memories are already at work in equipment that provides recorded voice announcements and in systems that administer and test digital networks. Eventually, the memories could be used in electronic switching systems, and in advanced home and business telephones.

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Mini More Than 'Toy'

By Patrick Conoboy
Special to CW

To most people, especially the layman, minicomputers conjure up a picture of machines that are a cross between computers and toys.

Perhaps it is something you play with before making the big step to a real computer. Why else would anyone call it a "mini" computer?

Personally, I always hated that term.

I well remember the day my manager told me I had to go to school to learn to program the company's new minicomputer. No way! I was a crack Cobol programmer and I was not going to jeopardize my career with this latest fad, let alone suffer the indignity of working with toy computers.

Like many in my profession, I started in data processing working with an IBM 360, a large mainframe that had a staff of four systems analysts, seven programmers, six operators, a programming supervisor, an operations supervisor, a tape librarian, a data control clerk, a technical programmer plus a data processing manager. I will not even mention all the keypunch operators. This was a six-day-a-week, three-shift operation.

This system was truly a mainframe — the only problem was the DOS system could only run one job at a time. No wonder we needed three shifts! Eventually we upgraded so that we could run three jobs at one time, then we went to two shifts instead of three. I think we should have called this system a "many" computer, since it kept so many people employed.

In contrast, the current system with which I am working is a Microdata Corp. Reality minicomputer. We employ one operator and one programmer/manager. We have no additional programmers, no tape librarian or data control, no keypunch operators and no technical people.

The system is user oriented and user driven using on-line CRT terminals, both local and remote. We have two 128K-byte systems and each one is capable of handling 32 jobs at once. The Reality is now capable of upper limits of 256K bytes with 48 terminals on-line.

I suppose we call this a minicomputer because it fits into an area the size of an average office. Actually, most of the room is taken up by communications equipment, which is needed because our 19 on-line divisions are throughout the Midwest and South.

Speaking of communications equipment, we at Clark Products, Inc. have successfully implemented numerous types of modems and multiplexers with our system. We also have a mixture of CRT terminals and terminal printer vendors. I have found very little equipment in the communications area that would not integrate with our system.

Beauty of System

I believe the transportability of asynchronous modems and terminals with this system is part of the beauty. Every time someone makes a cheaper or better CRT terminal we have been able to successfully implement its use.

The minicomputer has proved to be every bit as flexible as the mainframe, especially in its ability to handle a variety of data at varying lengths. For example, with our machine if the computer's field size is increased the record size automatically increases. This will particularly be handy when the Zip Code is increased from five to nine digits. As far as I am concerned, the only change I will have to make is on the reports that display the information.

I can honestly remember spending weeks changing Cobol and RPG programs on a mainframe because our company's sales reached $1 million. None of the IBM computer programs were prepared for that many digits.

The major concern of any data processing system is throughput. Can the system solve your needs, and do it in a reasonable period of time? In on-line applications, response is extremely important. The user is not concerned with access time or disk space allocation, or what language the machine is programmed in, only in results.

Our system has been extremely successful in the on-line environment. We have 19 remote divisions each with two CRT terminals and a terminal printer, including nine corporate CRT terminals and two line printers on-line 24 hours a day, seven days a week. The majority of the use is between 6 a.m. to 6 p.m. during the week.

Much of our batch processing is done in the evening by the operator I mentioned. This helps the interactive process during the day, although we do mix in some batch runs

(Continued on SR/16)

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*1st choice, OEM Disk Packs, Datamation "Brand Preference Study," 1979 and 1980.

*"All About EDP Media and Supplies," Datapro Research Corporation, September, 1980.

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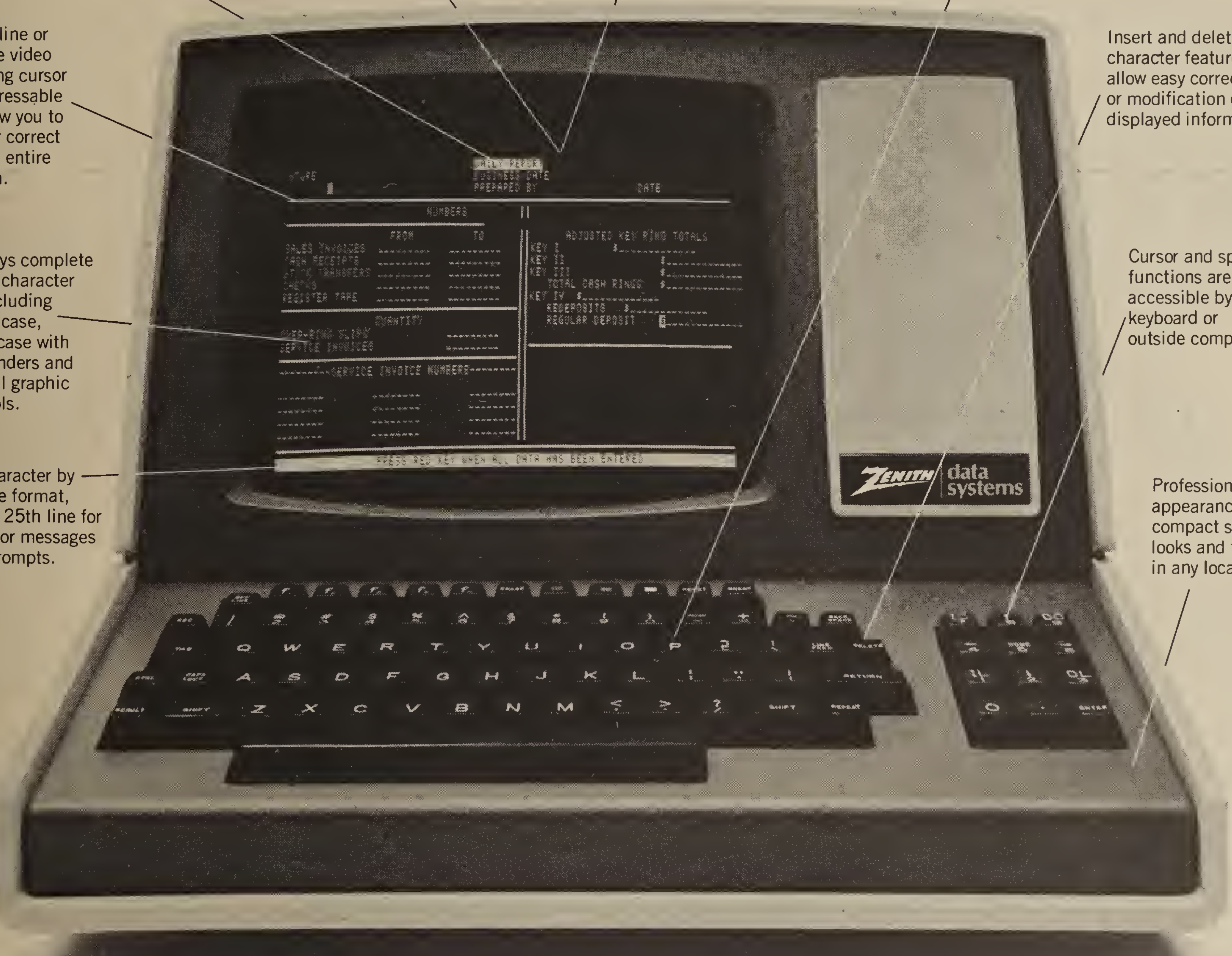

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CW 0727

Voc Ed School Using Mini as Training Tool

(Continued from SR/11)

put of a number of basic applications they have entered.

A commercial WP package on the mini provides the students with the capability of entering, editing and printing various types of documents and forms. Boces students are exposed to both the WP and DP tasks associated with classical WP applications. Along with entry operations, the ability to save, delete and restore documents provides a sound practical maintenance experience.

The students are exposed to system procedures and utility programs through a software program designed for Computer-Aided Instruction (CAI). The student's progress will be recorded and as each module is completed, a series of questions will test comprehension of that particular unit.

While the emphasis of the mini at Wilson Tech is on occupational education, administrative support programs are being designed and future trends appear to indicate a strong bond between vocational skills development and educational administrative needs.

Conaty is an instructor at the L.A. Wilson Technological Center.

Minis 'Real Machines'

(Continued from SR/14)

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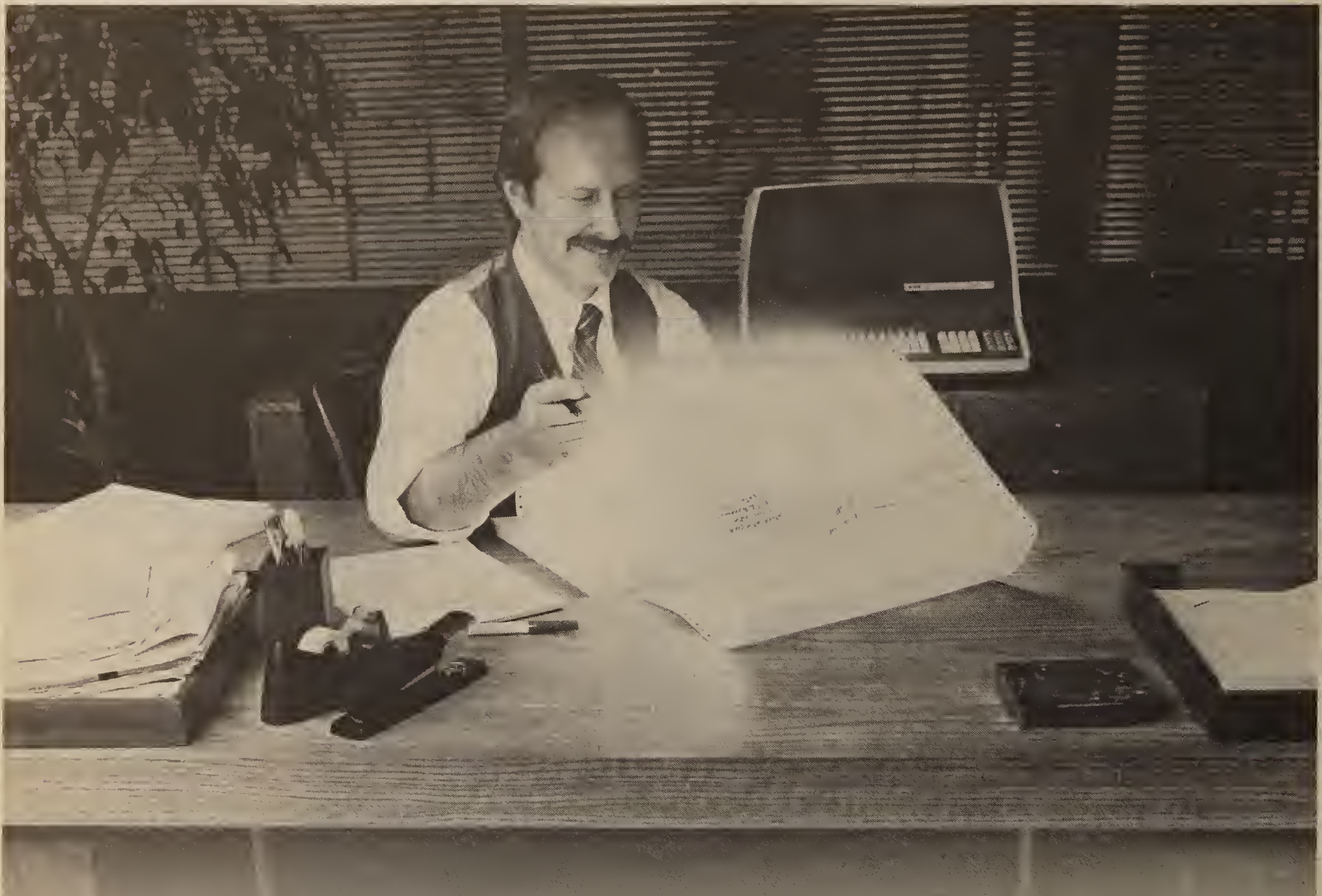
Conoboy is director of Information Systems at Clark Products in Elk Grove Village, Ill.



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'No Longer a Buzzword'

Distributed Processing: The Two Alternatives

By Pauline Lo Alker
Special to CW

Distributed processing is no longer a buzzword.

Today, more and more users are following the distributed approach as it becomes an accepted method of managing information processing operations.

Surprisingly, however, the products offered by most systems suppliers have so far fallen short of being a true distributed processing solution. In general, the distributed systems on the market today are evolutionary byproducts of the centralized mainframes.

While some of the processing functions have been shifted from a mainframe to a small processor, the processing power has remained centralized within the processor itself and passed along to users through dumb or semi-smart terminals.

This means that the problems of access and control have remained, by and large, unresolved. For that reason, the current "shared logic" approach represents only an interim step to true distributed processing.

The concept of distributed intelligence is to treat intelligence totally independent of the processing network. In such an environment, the intelligence is not centralized in one location, but spread through homogeneous modules.

With this approach to distributed processing, the user's access to the system's processing power is no longer via a simple-minded terminal. Instead, each user has his own workstation, fully equipped with CPU, memory, CRT terminal and maybe a local mass storage device.

Benefit of Shared Logic

The benefit of a shared-logic system — one that gives multiple users access via dumb terminals — is that the cost of terminals is relatively low compared to the cost of intelligence. However, with the introduction of low cost but powerful 16-bit microprocessors, the argument behind costs savings through shared logic is invalid.

In addition, the drastic limitations in performance, functionality, configurability and expandability inherent with a shared-logic system far outweigh any of its cost advantages.

With the threat of a recession, coupled with the realization that inflation is eating away corporate profits, the emphasis on productivity is becoming the most important factor in the selection process of a distributed processing solution. In terms of systems requirements, productivity pertains to performance, reliability, adaptability and expandability.

Multifunction System

A multifunction distributed processing system is capable of performing several different functions concurrently. In examining all of the system's activities, we find that the overall demand for systems resource is 30% I/O and 70% CPU.

In a shared-logic environment, each one of the user's I/O requests becomes at least one CPU request and one I/O request, since all the I/O devices are controlled by the same CPU. CPU-related activities, although normally fast, are burdened by slower I/O activities. About 80% of a shared logic system's time is devoted to processing I/O while only 20% is left for processing CPU-related activities.

Therefore, in a multifunc-

(Continued on SR/22)

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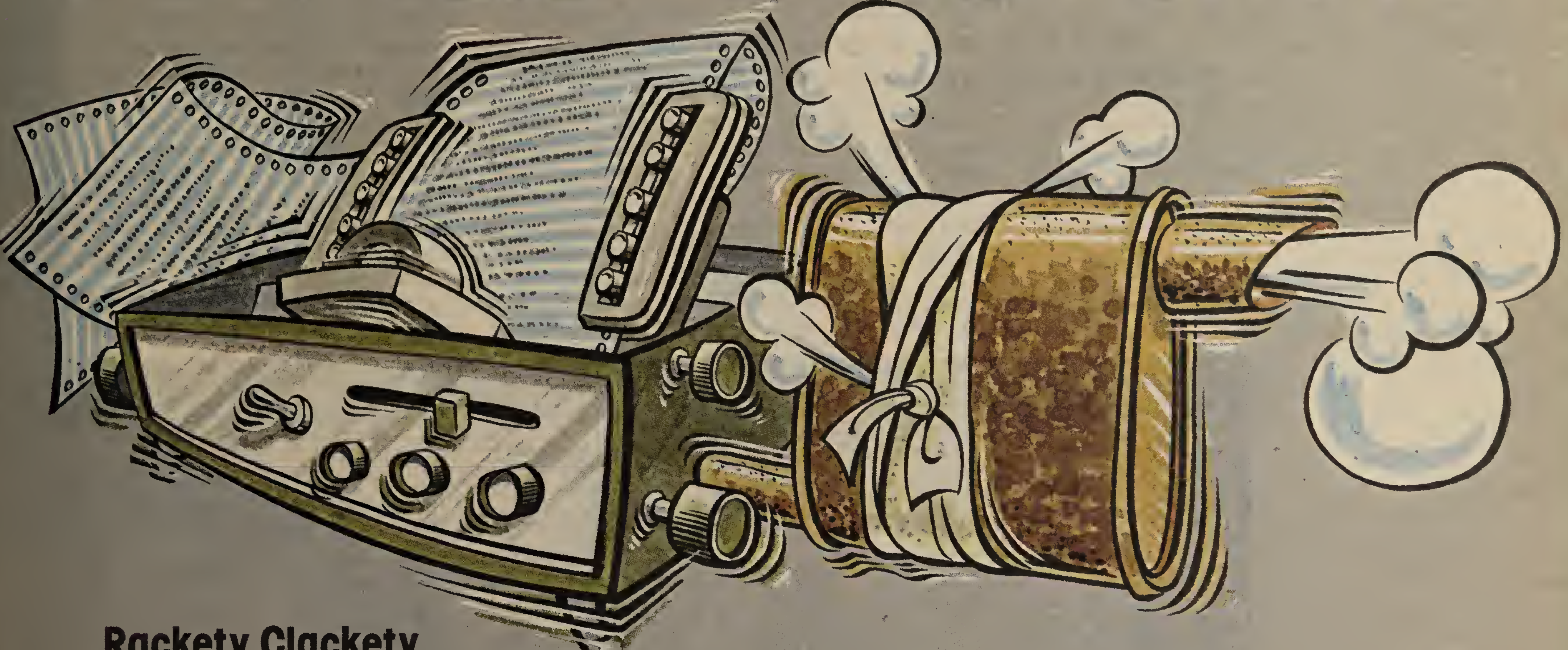

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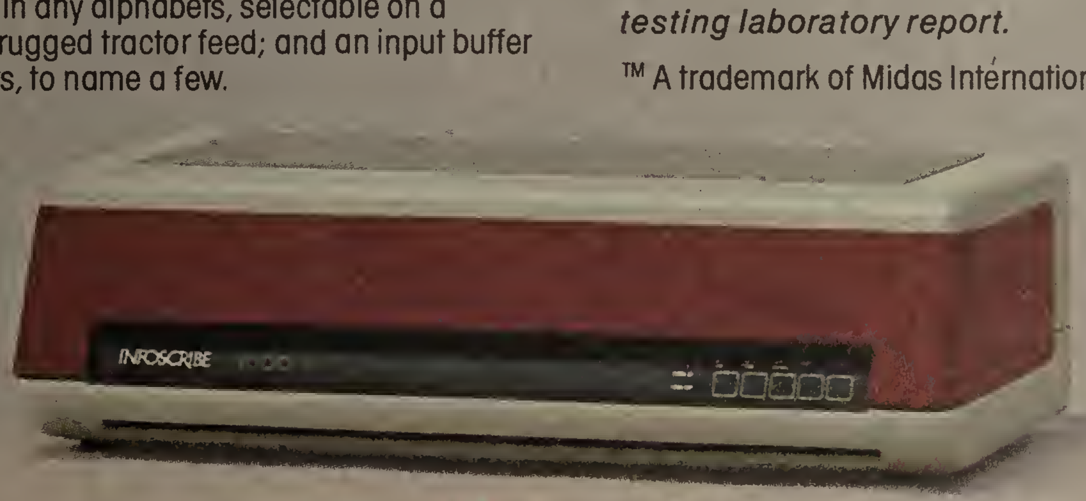

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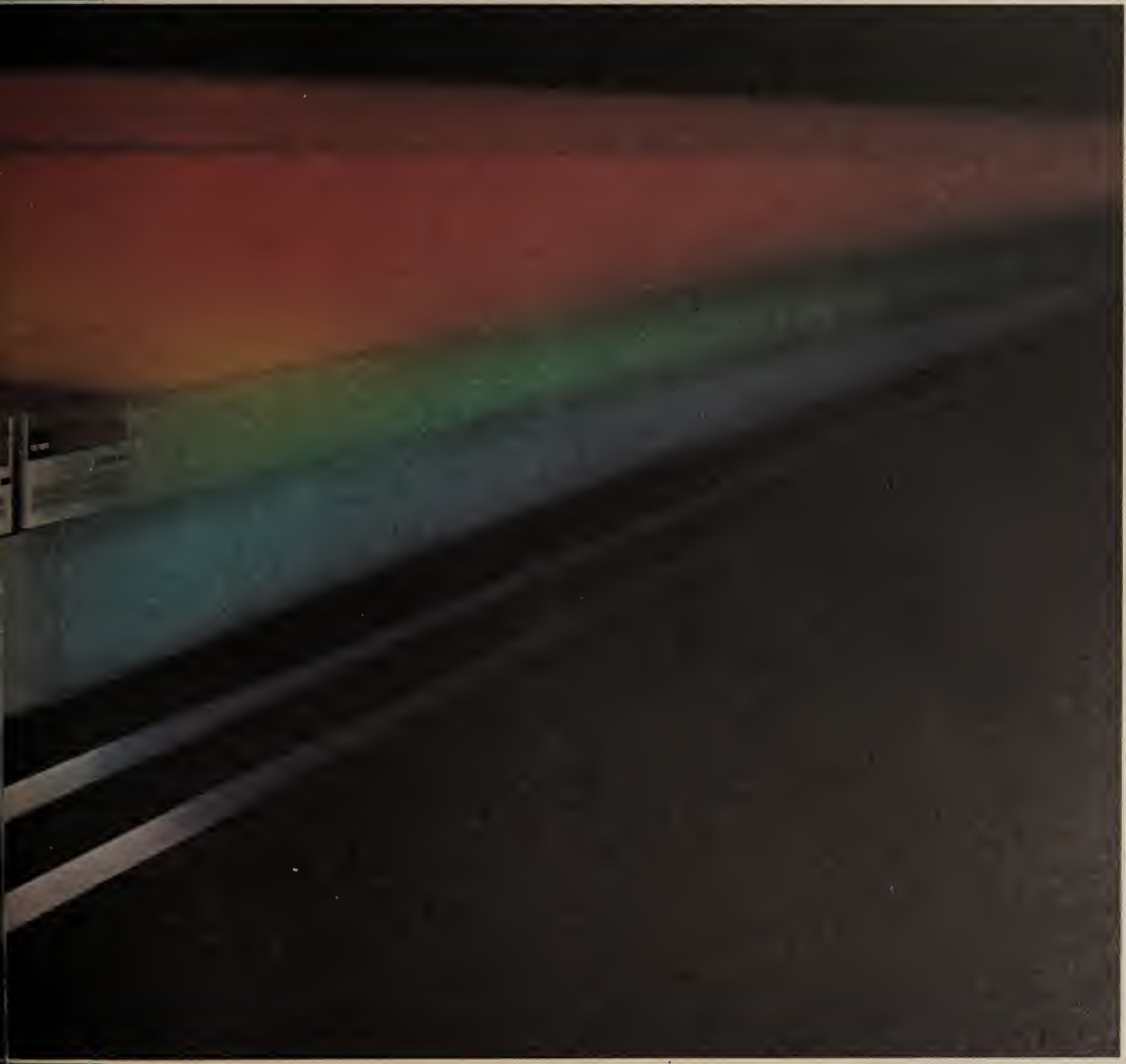

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As Processor Distinctions Blur

Minicomputer Suffering Identity Crisis Today

By Frederick W. Simmons
Special to CW

For some time, the prevailing view in data processing has been that the world of computers, at least in a product sense, is divided into three parts: microcomputers, minicomputers and mainframes.

However, recently it has become fashionable to publish papers and articles that proclaim these distinctions have become blurred. Rumor has it that minicomputers are really mainframes, mainframes are actually minis and that microcomputers cover the entire spectrum.

Casual observers and those with untrained eyes see the industry in an uproar. If minicomputers will not stay in their place can Armageddon be around the corner? Traditional computer product boundaries have indeed been violated. This is a fact that must be recognized and dealt with, but not necessarily with alarm. If the term "minicomputer" has lost its meaning — as it probably has — it makes more sense to define and understand the new descriptors than hold on to tradition.

First, the nomenclature is not chiseled in stone. Minicomputers were not always called minicomputers. Prior to about 1967, they were referred to as compacts, acknowledging their small physical size and, most importantly, their small word size (12 to 24 bits). Small word size was a novelty then that quickly led to technical innovation in instruction set architectures and addressing mechanisms.

Second, the technology associated with each class of computer has always been a strong factor in defining the class itself so, to the extent that technology migrates across products, the distinctions will become blurred.

Univac 1100/60 Example

A prime example is the Sperry Univac Corp. 1100/60 that was introduced in mid-1979. The 1100/60 is a "mainframe" in the classical sense that employs a multiple microprocessor design. The 1100/60 uses sets of microprocessors (microinstruction execution units) that operate concurrently on separate parts of a macroinstruction. So what is it? Another example is the recently introduced Intel Corp. 432. I've seen it referred to as the "microprocessor mainframe" so the identity crisis is real. I view the product as microcomputer technology in a large machine architecture context. What about IBM's "E Series"? A mainframe or a minicomputer? There are lots of other examples of the aforementioned identity crisis. In my opinion this does not necessarily negate the idea of segmenting computer products. However, it does mean that our current terminology and nomenclature is probably obsolete. The following describes some useful ways of viewing computer product segments or classes.

One point of view is the end-user application. Microcomputers today are, to a large extent, used in controller applications where the processing required is problem-specific and highly predictable. Low-cost, low-overhead processing is the pertinent characteristic with the logic very much device-imbedded.

The user is often a logic designer or a device designer or someone with significant data processing sophistication. This is precisely the slot occupied by minicomputers in their early days. Minicomputers were considered ideal for lab or process control applications.

The middle stage is one in which computers are embedded in systems often used for real-time applications. The user is an OEM or systems house that assembles a processing system usually for a custom application. This is the area that until recently was occupied solely by minicomputers. Now microcomputers are starting to prevail in the application area.

General-Purpose DP

Finally there is general-purpose data processing where off-the-shelf solutions are furnished to business or scientific end users with relatively low levels of DP sophistication. This is mainframe country, but minicomputers are appearing everywhere. Another point of view reflects the software environment.

At the lowest levels, computer systems operate in an austere software environment. Development support tools are sparse and the amount of available system software (operating systems, language processors and so on) is limited.

Applications software is similarly highly customized and special purpose and is often written in assembly language. This environment has been characteristic particularly of the microcomputer market over the last few years, but at some stage in their life cycle both minicomputers and mainframes have passed through this phase.

The intermediate phase typically finds greater employment of off-the-shelf operating systems, high-order languages and development support tools.

System support packages such as data base management systems (DBMS) and applications packages begin to emerge.

At the top end every attempt is made to minimize custom software with a full range of packaged software available. This describes the current mainframe class, but minicomputers are beginning to evince these characteristics.

Over the entire spectrum of computers, the level of software sophistication has been an important and measurable milestone of product life cycle.

Standardization and compatibility are another set of dimensions. At the lowest level only a modicum of compatibility is deemed necessary. The intermediate stage provides a higher degree of standardization — certainly high-order languages standards and several protocol layers — with interface compatibility being a prime determinant. At the top level full standardization and compatibility are usually available.

Simmons is manager of the Software development department at the Systems Group of Systems Development Corp.

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Distributed Processing: The Two Alternatives

(Continued from SR/18)

tion processing environment, a shared logic system's performance is often unimpressive. On the other hand, a distributed-intelligence system isolates the CPU activities from I/O activities, leaving processing power to CPU-intensive chores.

As for reliability, a shared-logic system's vulnerability rests entirely on one single spot: the central processor. But with a distributed approach, the central node is merely another workstation with the CRT display, dedicated to the controls of physical and logic I/O resources. The vulnerability factor is thinned out. Reliability can be further enhanced by attaching local I/O devices to the workstations themselves.

Finally, as to adaptability and expandability, in a shared-logic system, all applications software and hardware must go to the central processor.

In a distributed intelligence approach, each workstation is an autonomous entity. Its association with other workstations is to form a cluster and share the logical or physical resources. But the association is strictly voluntary.

Alker is vice-president of marketing for Convergent Technologies, Inc. in Santa Clara, Calif.

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Room for Management Improvement

Minicomputers No Miracle for DP Auditors

By Jarlath O'Neil-Dunne
Special to CW

To most small companies, minicomputers are a welcome relief to the manual methods, archaic accounting machines and computer service bureaus that previously handled the processing of data.

However, despite their small size and lower cost, the minicomputer's apparent "electronic salvation" can be misleading. In fact, it may even be the source of a constant headache from an auditor's point of view.

DP auditors who work with small systems can look forward to fewer available auditing software packages, fewer reliable controls, less on-site technical expertise, mediocre reference documentation, smaller and often entrepreneurial business circumstances and a management that operates under the misconception that great costs are involved with establishing adequate system controls.

> *'The differences between large and small systems stem less from the nature of the hardware than the fact that the minicomputer management is often less experienced in computer technologies.'*

Increased Risk

The differences between large and small systems stem less from the nature of the hardware than the fact that the minicomputer management is often less experienced in computer technologies.

Because a small computer can be placed virtually anywhere, there is an increased risk of unauthorized access to the system. Since a staff with little or no computer experience can be taught to use the system and its terminals, control over the terminals and to data and programs is of primary importance.

Unfortunately, much of the system software on the market does not include adequate security features. And even if the software is adequate, management may be either unaware of the security features or perceive them as detrimental to efficiency.

These security options are usually not implemented until a disaster occurs.

Reliability Ensured

Many people believe, correctly, that controls in DP systems reduce the possibility of fraud. However, the main purpose of these controls is to ensure the reliability of the management information provided by the system. This is especially important for key financial and accounting data. At the same time, good control practices improve a system's operational effectiveness.

Control within each application should be designated to ensure that transactions are completely and accurately processed in accordance with management's intentions and that security is maintained within the system.

In controlling a DP system, it is most important to recognize that important processing and control procedures are performed by programs. These "programmed procedures" must receive special attention if the system is to function reliably. Thus controls are needed to ensure that new systems are properly designed, programmed, tested and implemented. (Equivalent controls are needed over the selection of purchased software.)

Once installed, controls are necessary to maintain security of the programmed procedures. Additional controls are needed over computer operations to ensure that the programmed procedures are consistently applied. The total system of controls will then become the coordinated responsibility of man-

(Continued on SR/26)

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DOMAIN is designed to accommodate a wide range of application environments, including scientific, engineering, research, finance, CAD/CAM, text processing and transaction processing. The system is capable of running very large, single program applications, as well as multiple program applications.

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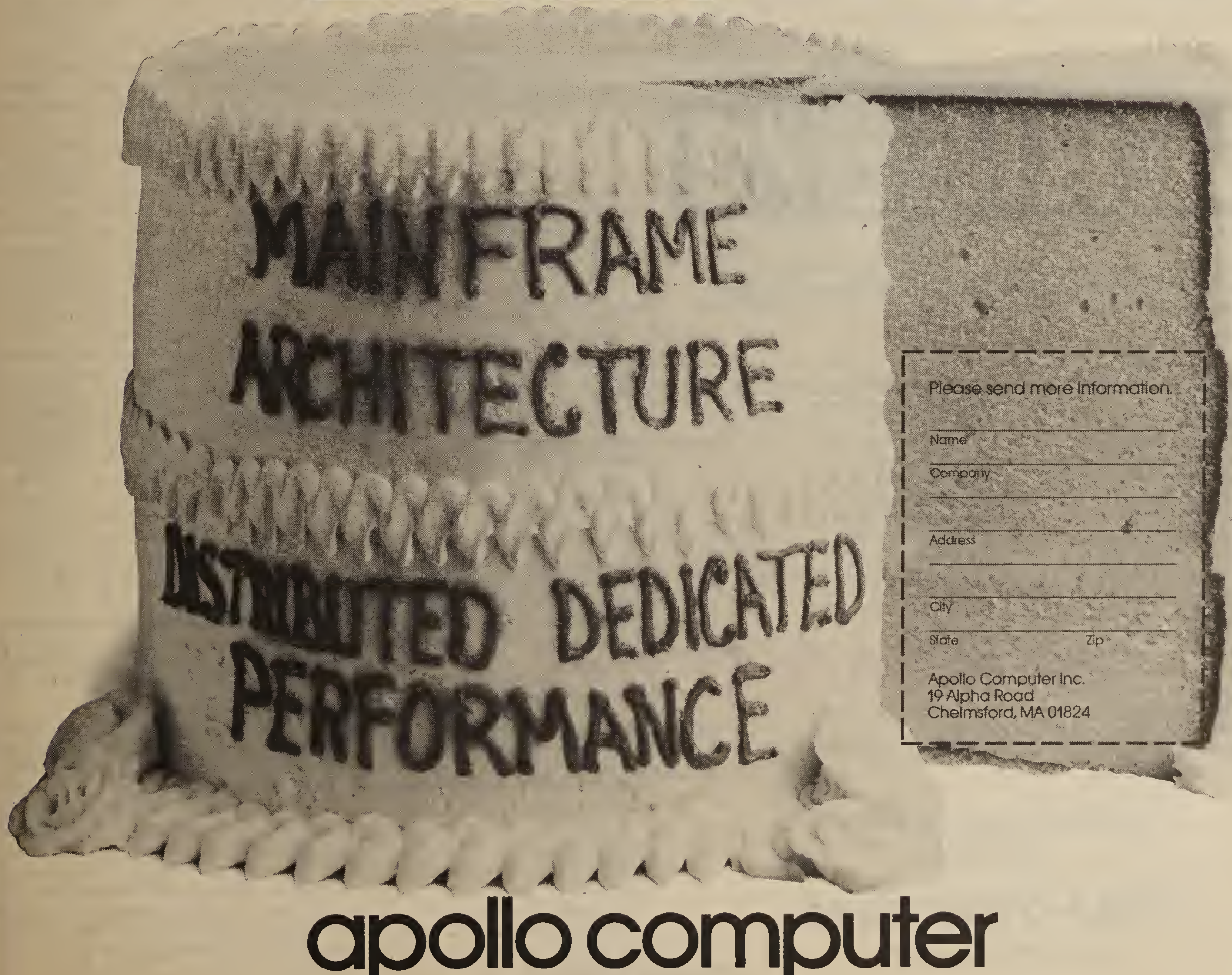

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Minis Prove No Miracle For Some DP Auditors

(Continued from SR/24)

agement, DP and the user.

Defining control requirements is easier than implementing the controls themselves. In implementing good control practices, the larger organization encounters problems different from the smaller business. The larger organization, which is accustomed to computer processing, uses small machines in either a standalone situation or as part of a distributed network.

Management, the MIS function and internal auditors will be well aware of the importance of controls. They will need assistance in identifying risks inherent in the new configurations and in identifying effective control techniques.

Smaller organizations may be more restricted by a combination of limited staff and lack of DP systems experience. Consequently, while many of these businesses are running complex systems, they are employing software that lacks adequate control protection.

Limited staff make it difficult to arrange an effective segregation of duties. The user may improperly check the control information provided by the system.

Even worse, many systems do not capture and report key information necessary for controls. This reinforces the need to review controls before systems are developed or purchased.

Control Solutions

The solutions to these control problems are not particularly difficult or costly. Minicomputer experience is available from a number of sources including:

- The organization's MIS function.
- Internal auditors.
- External auditors or consultants.
- Books, journals or training courses.

Reading and training can provide low-cost advice. This is useful for small, low-risk projects, such as the purchase of a small microcomputer system or word processing machine. For larger projects, direct assistance is more effective.

However, it is important that the advisor has the relevant experience. Previous experience in the design, selection and implementation of small business systems is essential. General DP or DP audit experience may not be enough.

Further, the time and effort spent on the selection process must be in line with the total cost of the new system. There is no point in wasting six months of management time to select a system that represents only a small part of the total budget.

Auditors faced with small computer dilemmas can get assistance through training programs jointly sponsored by Coopers & Lybrand, Inc., which has a separate Computer Audit Assistance Group, and organizations such as Datapro Research Corp. and local chapters of the EDP Auditors Foundation.

There are major advantages to involving internal or external auditors in the selection or design process. An experienced systems auditor, particularly one trained to work on smaller systems, can audit the controls before the new system is installed, avoiding costly changes later on.

Auditors' Problems

Auditors, of course, have their own problems when dealing with minicomputers. There are problems in designing effective control procedures for the small sizes of staff involved. A vast variety of vendors are selling minicomputers, often with inadequate security built into the software. The multiplicity of equipment compilers, interpreters and other software makes it difficult for auditors to keep up with the technology.

In mainframe situations, DP auditors have had generalized audit software packages available to them. It is unlikely that this same software will function on the smaller machine. Unless the hardware is directly connected to a mainframe, transferring files may also be difficult due to the incompatibility of file media and formats.

There are a number of effective techniques to deal with the inherent problems of auditing and control in a small systems environment:

- Many systems offer powerful interrogation command utilities through which the auditor can interrogate files.
- Most machines have RPG II, Basic or Cobol languages. Although the standardization of functions is less than the auditor might hope , an understanding of the job control language, or its equivalent, is important. This is especially true when auditing turnkey systems, where users may not know how nonstandard functions can be performed.
- Finally, audit software aids are developing in two directions. First, there are the application-specific packages, such as the series designed to audit IBM's Mapics system, which is used by many System/34 manufacturing entities.

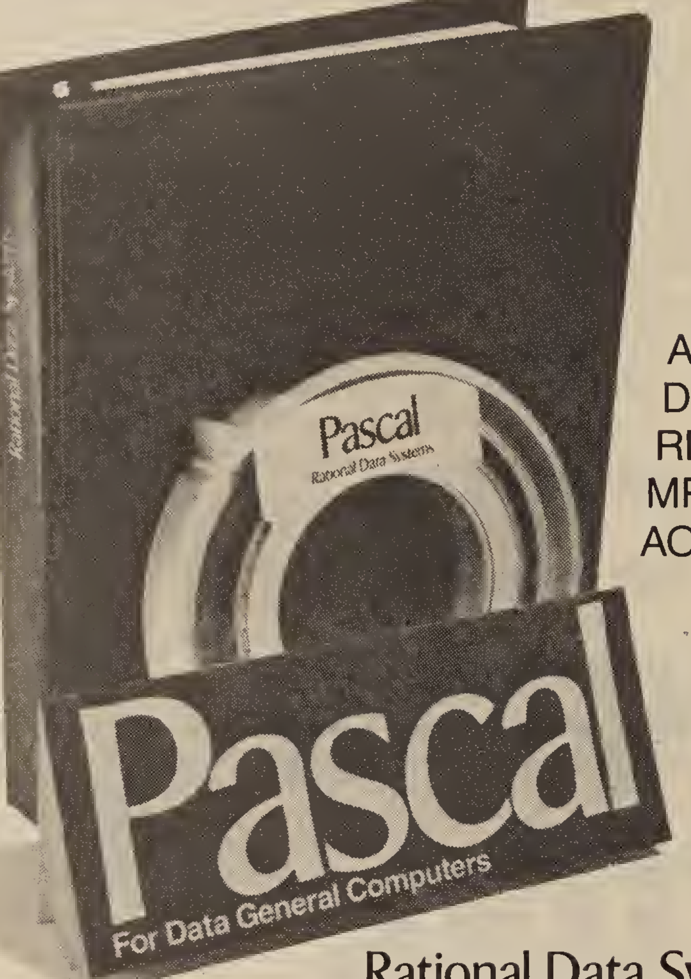
Easy to Use

These packages are extremely easy to use, as the audit functions are precoded into the package. The second is the development of hardware-independent audit software. This is enabling accounting firms, especially Coopers & Lybrand, to extend its audit software library to a wide range of machine types.

In the long run, how does management meet the control problems of the minicomputer? The experienced minicomputer user will probably have the answers already.

The less experienced user will need training or assistance from inside or outside the company. Management must be better informed in the selection and planning of minicomputer systems, especially in the implementation of controls.

O'Neil-Dunne is a chartered accountant specializing in DP auditing at Coopers & Lybrand, Inc. based in New York.



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[1] EDX Versions, Sept. 1981.

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Mainframe to Mini Switch Saves $40,000/Mo

By Mitch Modeleski
Special to CW

SAN RAFAEL, Calif. — What do you get when you mix 40 scientists, a million lines of simulation code and two Control Data Corp. 7600 mainframes? The answer: A monthly computing bill of $50,000.

What do you get when you load this same work onto Prime Computer, Inc.'s 750 minicomputer? The answer: The same processing results, but at a monthly cost of $10,000.

Although our initial reasons were economic, hindsight supports our switch to Prime's supermini on numerous other grounds that include interactive program development; a Fortran that is fast, efficient and reliable; an operating system that is flexible and responsive; source level debugging; and a system architecture that blends interactive, batch and background modes in a healthy hybrid of expansive virtual memory and solid, expandable hardware.

Scientific Improvement

Systems Applications, Inc. here was established to improve the scientific and engineering bases for solving key problems facing society in environmental management and telecommunications. Notably, it pioneered the development of its Airshed Model, which provides a quantitative method for simulating existing air quality and evaluating alternative emission control strategies for the nation's metropolitan areas.

A typical run of this model requires more than 30 minutes of CPU time on a CDC 7600 machine.

Although much slower by comparison, our Prime 750 was programmed to hold such long jobs in a deferred queue for execution at night. This freed the CPU for a robust mix of daytime interactive time-sharing, queued batch scheduling and background job processing.

Within eight months after its arrival, the Prime 750 had attracted all scientific users in-house and, within 16 months, had seen the conversion of corporate accounting and project management from an IBM service bureau. It is safe to say that our mini has been nothing short of a thief, stealing major accounts from the largest mainframes in the San Francisco Bay area.

However, success was not automatic. As delivered from Prime, a number of system utilities were lacking the capabilities or performance demanded by our huge computational workload.

System accounting was greatly enhanced to track project consumption of key resources in three modes of usage during three time shifts: to permit discriminate charging, to encourage efficient system utilization and to provide accurate and timely usage reporting to management and staff.

Electrostatic plotting was optimized by eliminating processor overhead in disk I/O operations and by installing an efficient raster compression scheme in the standard plot spooler. Our plotter eliminates at least six paid artists by generating camera-ready graphics for our client reports.

The vendor's batch processor was enhanced to provide multiple streams with different scheduling characteristics. This modified batch processor has seen more than a million seconds of CPU time per month and helped deliver the all-time Prime record of 132 CPU hours in a single week.

Dynamic response and memory utilization were obtained by installing semaphore logic in all appropriate system software.

Finally, a special subroutine library was developed to allow users to perform file transmissions at very high speeds without modifying the compiler or operating system.

Modeleski is director of computing at Systems Applications, Inc., San Rafael, Calif.

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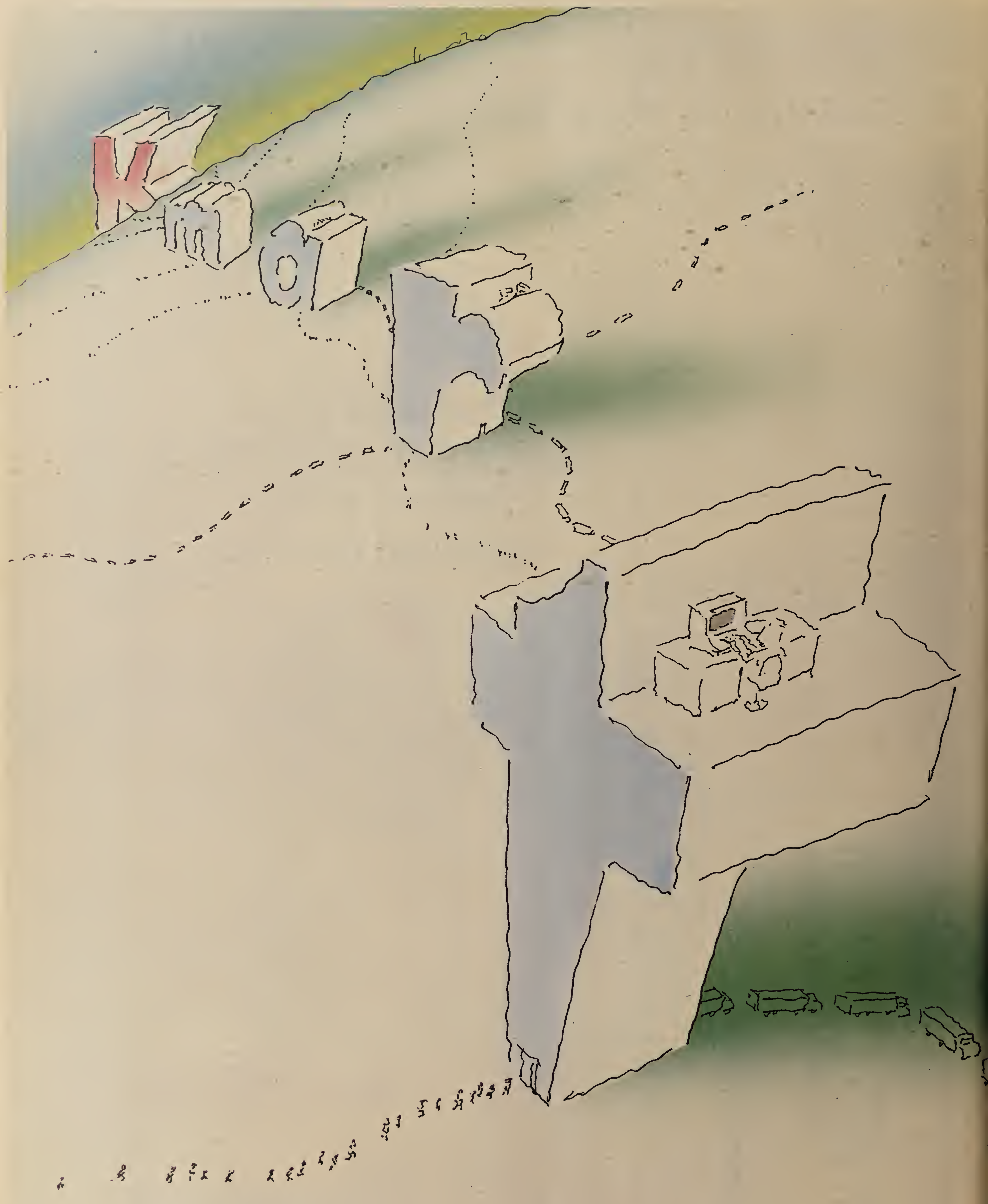
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Gerry Fletcher, V.P. Of Corporate Information Systems, K mart.

K mart is one of the world's largest retailers. But that doesn't mean they use only the largest computers.

In fact, K mart has bought hundreds of IBM's smaller computers, the Series/1. And they've ordered more.

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Gerry Fletcher, K mart's V.P. Of Corporate Information Systems, explains. “We needed to have processing capabilities available at local stores similar to those we have at headquarters. Series/1 has more than met our needs.”

One need was freeing central management from long waits for local data.

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And K mart's store managers needed freedom to do their own processing locally.

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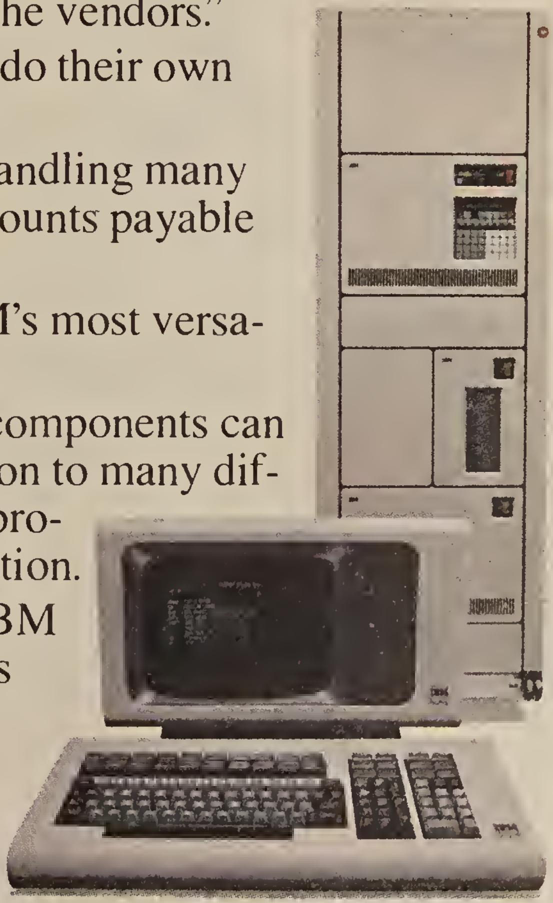
For more information about Series/1, call your IBM General Systems Division representative or write us at P.O. Box 2068, Atlanta, GA 30055.

“Series/1 is helping free K mart to be more productive,” says Gerry Fletcher. “In a company like ours, small systems can produce big results.”



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Mini Branch Manager Laughed Out of Meeting

By Robert Davis
Special to CW

Recently, a large nationally known mainframe computer user invited me in to speak with eight members of its senior DP staff about a minicomputer system offered by my firm, Systems Engineering Laboratories (SEL).

This in itself was not unusual. I had made these presentations to other companies and was very pleased to come in and talk about SEL's 32-bit computer.

After speaking for more than an hour on the benefits and capabilities of a system that would easily off-load one of their mainframes, I was asked to configure and price an appropriate system on the chalk board. Just as I was concluding this process two persons in attendance started laughing and told me I was crazy. They said what I proposed was absurd for the price I quoted. They then got up and left the room.

I was stunned. Afterwards, during the ensuing months, I pondered at length why my product, a minicomputer, had been taken so lightly by these talented computer users.

Today, the term minicomputer is applied to systems that sell for $30,000 to $300,000. The minicomputer manufacturers prefer the label "mini" because it does not have the financial or political implications of the term "mainframe."

But historically minis have had less software, throughput and expansion capabilities than mainframes. Today this is no longer true. Historically, minis could only partially off-load mainframes, front-end mainframes, serve a dedicated function and so on. Today this is no longer true either.

There are minicomputers available today from billion dollar companies that offer features such as 16M bytes of main memory, 96 or more terminals on-line, 15G bytes or more of on-line disk storage, time-sharing operating systems, data base management systems, a lengthy array of compilers, utilities and application packages. Current price/performance ratios for minis are incredible.

This all sounds great to the mini vendors, but end users are not buying it. Mini vendors know their minis are better technically and financially than mainframe systems, but the traditional mainframe users seem to have a different perspective. Vendors always talk about prices.

Management in the user community, on the other hand, talks about risk. A businessman will not increase his risk just to save money on a computer system. It is simply not worth it.

To a businessman, a mini is a computer system, which means it is more than hardware and software. Businessmen know that they do not give away anything and that often when a price is low for a product, limited dollars have been invested in that product for support areas such as documentation, training, customer service and availability of software analysts.

Preconceived Image Problem

Minicomputer companies suffer from a preconceived image problem in the customer support and customer response areas. In many cases the mini supplier has strong technical depth on his staff, but if this is not seen as being available to the user during the presales effort then the vendor is considered to be technically shallow and probably unable to solve the customer's problems once he buys the system.

Documentation in the mini world is often not user (application) oriented. The documentation is reference oriented and presumes a certain level of prior vendor-specific knowledge.

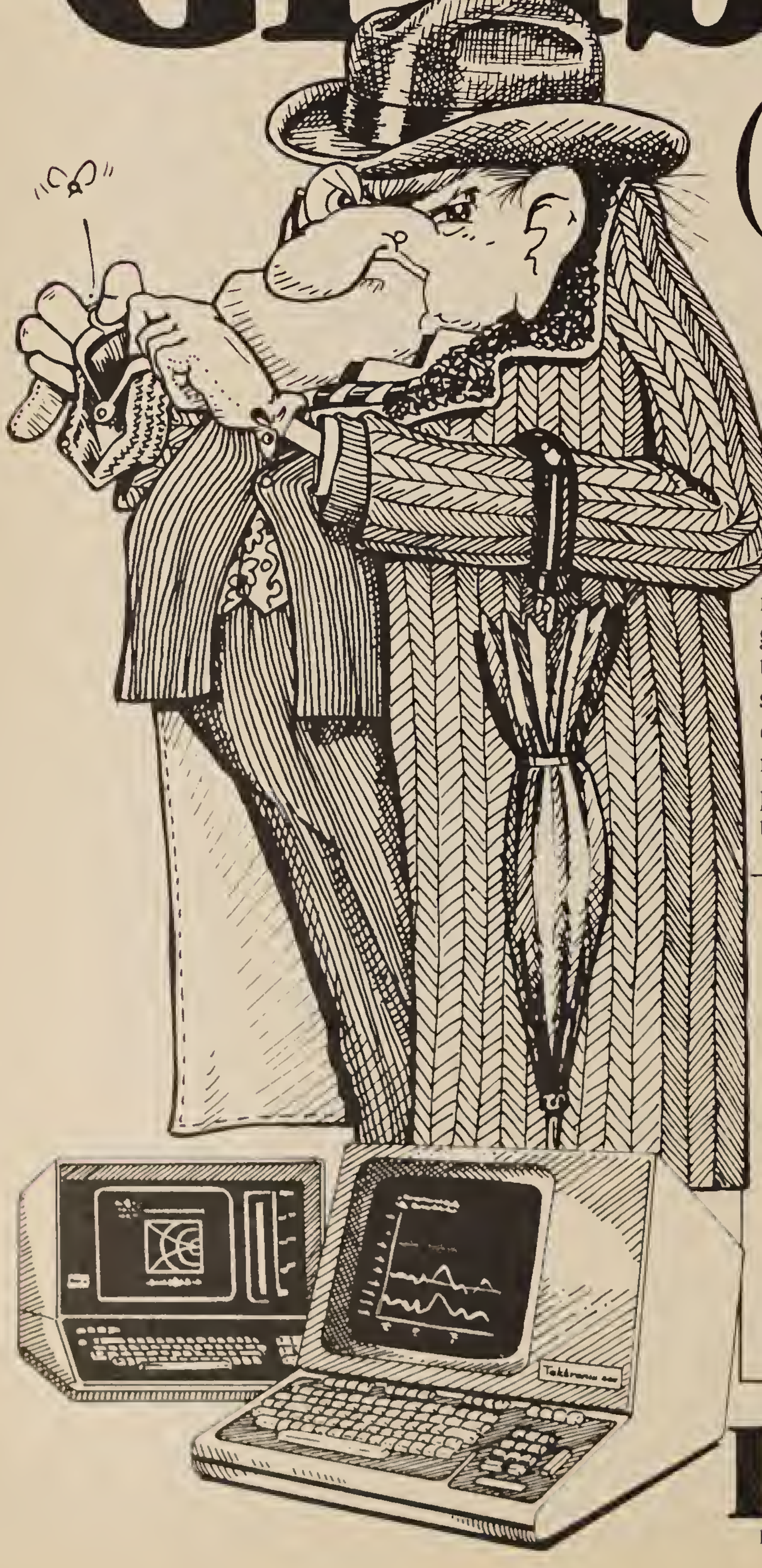
Vendors talk about the differences in the scientific and commercial marketplaces. Some even have marketing organizations designed to distinguish and capture these two different markets. However, many mini vendors through their sales organization and sales personnel inadvertently treat these two markets the same. They are still trying to sell technology to nontechnologists.

This brings us to the classic question encountered by the mini vendors. Should we sell this product to an "unsophisticated" user? Most vendors do not want a user that is too dependent on them. Most DP managers are accountable for the ultimate success or failure of their DP systems as perceived by their management.

Mini vendors feel that for users to acquire technical sophistication it is simply a matter of hiring the right people on the user's staffs and completely lose sight of the economics involved in hiring more people. There have been a couple of notable exceptions, but, by and large, mini vendors fail to approach the DP community in a businesslike manner and examine all of these areas.

Mini vendors will become more sophisticated as their revenues grow

(Continued on SR/34)



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HONOLULU — By replacing its six-year-old data processing system with a high-performance superminicomputer, one of this island's oldest financial institutions has streamlined financial services to customers and greatly improved staff productivity.

Bishop Trust Co. here has increased data-entry speed fourfold and produces 300,000 pages of printed documents per month. A subsidiary of Crocker National Corp., the firm has been headquartered here since 1906. With 160 employees, it is a pure trust organization, handling no other banking functions.

Bishop Trust's 25-person computer center rarely experiences a slow hour. Led by computer operations manager Larry Blake, the team operates in three shifts, servicing divisions of Bishop Trust and providing computer services to outside firms. Daily transactions number in the thousands.

About 50% of the computer center's time is devoted to trust activities for Bishop's customer base. The functions range from detailed property management and estate planning to managing customer investments and providing tax information.

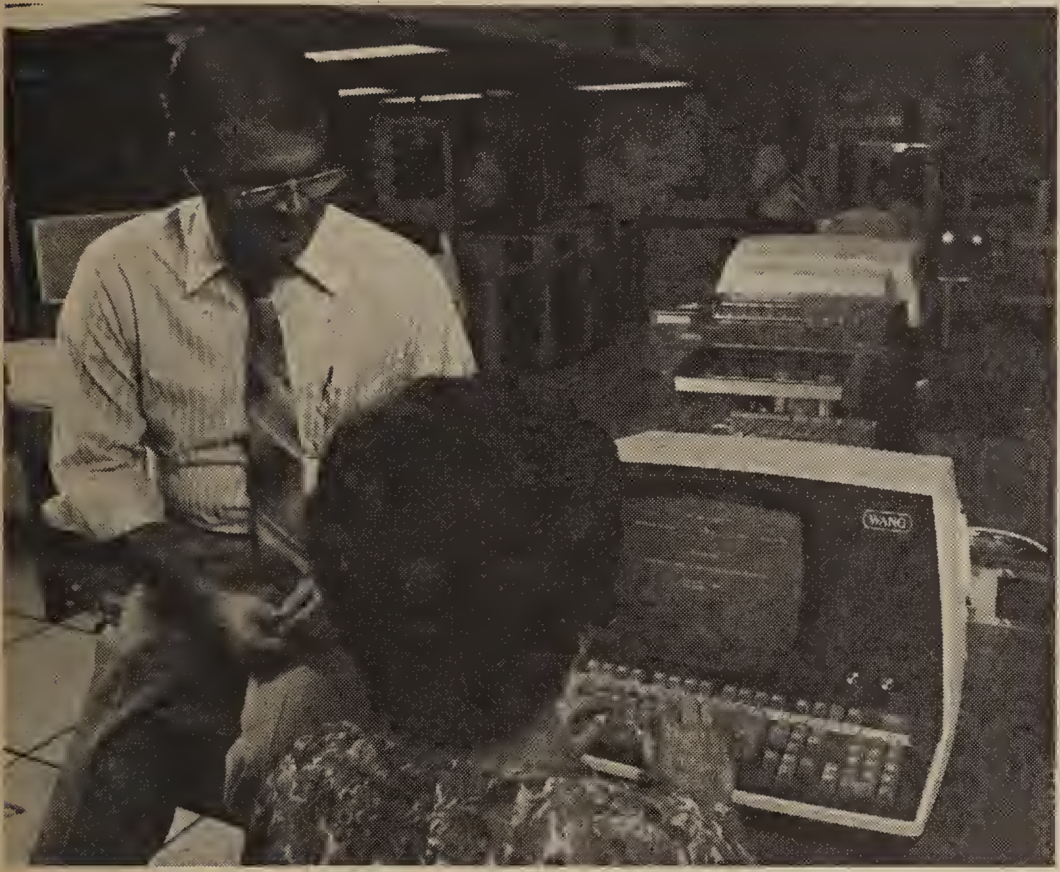
The center's remaining time is spent in the role of a service bureau for a variety of firms in the Honolulu area. According to Earl Naito, site manager, these services are as varied as the customers themselves. The center handles billings and receivables for physicians, dues collecting and pension funds for labor unions and various accounting functions for other financial institutions too small to justify the cost of a computer system.

For 10 years, the center employed various mainframe computers, including a Univac 9060 in 1975. By 1979, increases in the volume of work coming to Bishop Trust and the potential for attracting new business made an immediate system upgrade or replacement necessary. The system's first-generation front-end processor delayed response time as much as 25 seconds — a delay the center could not afford.

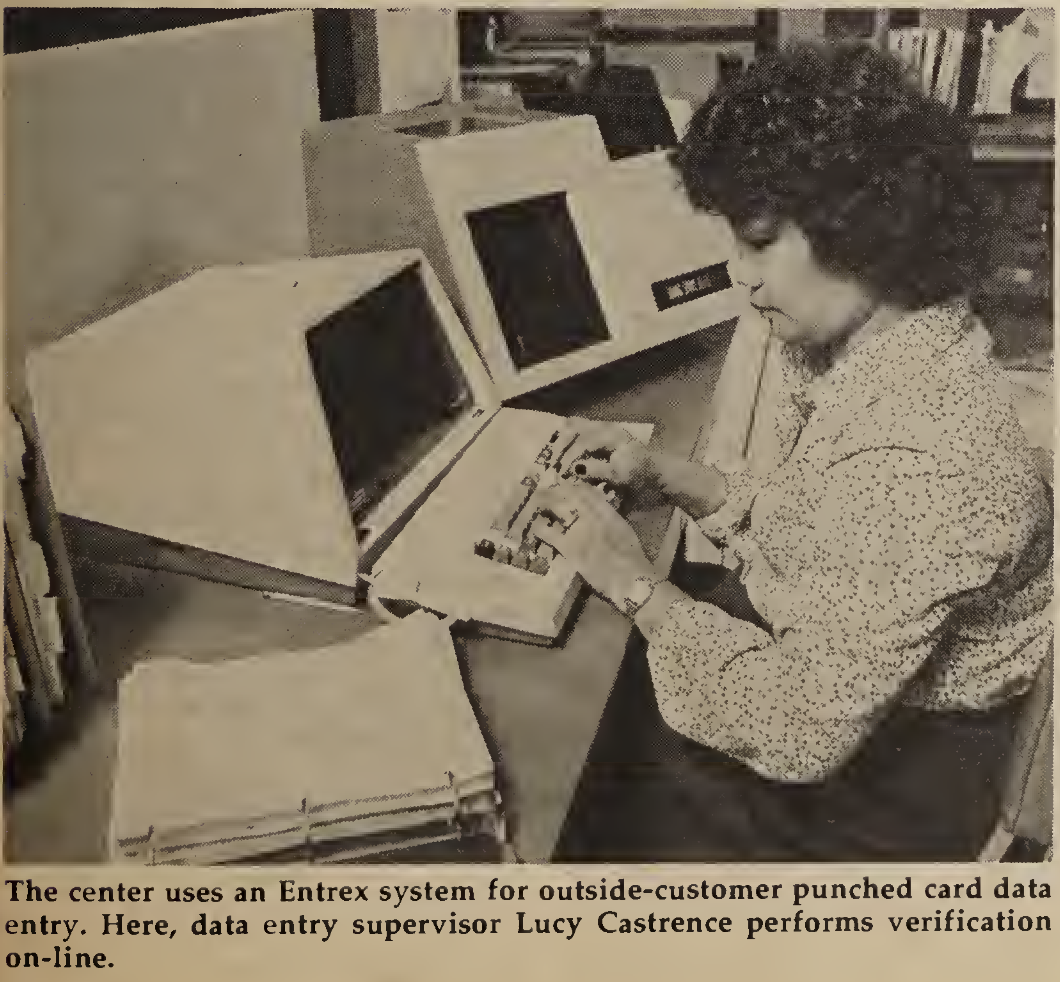
"We first thought of an upgrade, but bringing it off would have been much too costly," Naito said, "so we began evaluating entirely new systems."

(Continued on SR/34)

Earl Naito (left), site manager, and Al Vargas, computer operator, demonstrate Bishop Trust Computer Center's Wang VS80 system.



Larry Blake, manager of computer operations, reviews procedures with Jena Natividad, control clerk.



The center uses an Entrex system for outside-customer punched card data entry. Here, data entry supervisor Lucy Castrence performs verification on-line.

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Bookings Jump 31%

Firm's Sales on Rebound Thanks to Supermini

Special to CW

CAMBRIDGE, Mass. — For several months last year, the financial picture at Orion Research, Inc., a nine-year-old instrumentation company here, was slightly less than rosy.

Sales were below forecast in the firm's laboratory equipment division, the core of its business. And like many companies trying to increase profitability in today's economy, Orion was met head-on with the churning tides of inflation and rising costs.

After close examination of its marketing activities, the firm's management finally pinpointed the company's loss of prospective business to its overworked minicomputer system. Because of the system's inadequacies, the company was not able to follow up on its more than 36,000 annual sales leads. As a result, profitability suffered.

To combat its system's problems, Orion decided to transfer its sales lead system, called the Comprehensive Computerized Marketing System (CCMS), to a 32-bit superminicomputer. Three months after making the switch, the 32-bit system, manufactured by Prime Computer, Inc., has helped increase third-quarter bookings 31% over 1979's figures and handle more sales leads — all without adding to its sales staff.

System Features

Originally purchased in 1979 to handle the firm's general ledger, accounts payable and manufacturing resource planning, the Prime 750 minicomputer has 3M bytes of memory, 800M bytes of on-line storage, a 600 line/min printer, a 300 line/min printer, five letter quality printers and one magnetic tape drive. In addition, the system and peripherals support 35 Prime Computer, Inc. intelligent terminals.

Orion is a world leader in the development, manufacture and sale of sophisticated analytical instrumentation for laboratories. The company employs approximately 450 people. Orion sells its products to hospitals and universities, clinical, industrial and private labs and process/quality control departments in manufacturing and power generating plants. Founded in 1962, Orion's sales have increased from $8.5 million in 1976 to $19.3 million in 1980.

Orion has three product groups: industrial, biomedical and laboratory equipment lines.

In 1977, Orion president John H. Riseman expressed concern about the delay in processing literature requests due to cumbersome manual screening. The company was spending a great deal of money on technical trade journal advertising, and Riseman was convinced his company could get more business from the 500 weekly sales leads generated.

The initial version of CCMS was developed by Orion's computer group in 1978 and implemented on an in-house minicomputer. It allowed on-line screening of leads, but did not enable management to measure how well each lead was handled in the field.

CCMS Enhancements

During 1979, CCMS was enhanced to track the status of each lead and report sales force effectiveness. A computer generated "prospecting list," also initiated at this time, was sent weekly to each sales representative.

With new enhancements and additional uses of CCMS being developed, it became evident early in 1980 that the software was outgrowing its hardware.

"We needed a computer that would help us implement modifications to CCMS quickly and efficiently," Paul Stager, Orion director of information systems, explained.

"Our former in-house mini supported only three on-line terminals, severely limiting the number of people able to input and access data. We also needed a computer with sophisticated data base management software to provide easy access to information and a high level of security for our customer data."

CCMS was converted to the Prime computer in October of 1980. "For very little additional expense, we were able to add a major new application to the Prime system with no performance degradation," Stager said.

CCMS helps marketing executives with two of their most challenging tasks; improving sales force productivity and evaluating the effectiveness of sales promotion activity.

The software enables the firm to coordinate and report on all marketing related activities throughout the corporation, including fulfilling requests for literature, assigning prospective customers to salespeople, monitoring follow-up activities and maintaining information about the characteristics and interts of the firm's customers. CCMS provides in-depth statistical reports that are used by Orion management to analyze and adjust the company's marketing strategies.

Organized Data Base

CCMS utilizes a well-organized data base that maintains a record of every customer contact, as well as information about the company's sales force and dealer network. The system allows on-line search for customer information, as well as on-line data entry and prospect validation.

Today's version of CCMS consists of two major sections: Literature Request Processing and Lead Assignment and Follow-Up.

When a literature request is entered into the computer, a series of on-line tasks are first performed to ensure that the "customer" is not a competitor or a literature collector and that his request is not a duplicate.

If a customer's address is already on the data base, the operator enters only his name, title and telephone extension. Next, the source code and "action pathway" are entered. Using these, the computer automatically determines the literature to be sent.

Later that day, the customer's literature fulfillment form is printed. This form has a picking list of the literature requested and mailing address information, which will show through a window in the envelope. At this point, the system associates the action pathway to a sales territory or an inside sales person for follow-up action. Each sales person receives a weekly list of prospective contacts and new leads.

Entries on this list are considered satisfied when requests have been answered personally, or a sale is made.

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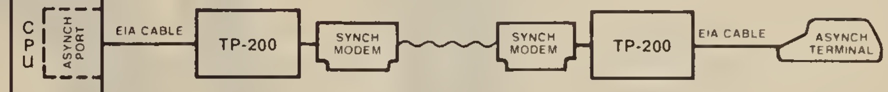

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Supermini Helps Firm Streamline Services

(Continued from SR/31)

Naito and his staff spent several months examining systems from 15 different companies and eventually narrowed the field down to Burroughs Corp., IBM, Sperry Univac and Wang Laboratories, Inc. Foreseeing a steadily increasing work load, they were looking for the system that would expand to meet anticipated future needs.

The company finally settled on a Wang VS80 computer system, both because the system could be easily upgraded to meet future needs and its operating system was compatible among many Wang models, Naito explained.

Installed in January 1980, the system has 512K bytes of main memory, four disk drives, totaling 1G byte of storage, and two 75-in./sec tape transports. Peripherals include five Wang video terminals in Bishop Trust's accounting department, 10 in the computer center and 10 in other departments including remote terminals in the firm's Hilo office.

For data entry, the center employs an eight-terminal Entrex system online to the Wang VS through a 2780 Emulation on a 9600 Baud Modem Eliminator.

The majority of printing is handled by a BDS Corp. WI-22 controller and Model 2550 dual capability printer, giving 1,200 lines/min with a 64 char. all caps set and 900 line/min with a 94 char. upper and lower set.

The firm currently supports customers at five remote locations — a mortgage loan broker and servicing company, a title insurance company, an escrow service company, a combination title and escrow company and a branch office of Bishop Trust.

Three of these locations have remote workstations, communicating through leased lines and Gandolf 9,600 bit/sec limited distance modems. Other remote users have VS systems that communicate through leased lines to the Bishop VS80 installation.

Because of improved programmer productivity, Bishop has significantly reduced its backlog of jobs and is now able to respond to requests from other departments on a more timely basis.

Handling trust work involves continuous updating of customer files as investment status changes. All information affecting a customer's account is entered into the Wang system throughout the day via terminals in the accounting department.

"At the end of a given day, there might be hundreds of entries for just one customer," Naito observed. "When you're managing thousands of dollars in investment capital, every move you make is crucial and everything must be on record."

Night and Day

If a customer calls in during the day to get the status of a particular holding, the operator in accounting simply accesses the customer file on his terminal and in a few seconds, he has the information he needs in front of him.

"The three seconds or less response time on the Wang compared to 25 seconds on the other system is like night and day," Naito said. "The new system has also decreased set-up substantially and increased our input speed about fourfold."

According to Naito, the center prints around nine million lines, or 300,000 pages/mo. "Obviously, if we tried to do all our printing on the Wang, we'd never get it all done — the printers are just too slow," Naito said.

Daily, weekly and monthly reports are printed and circulated both to Bishop customers and throughout the organization.

Daily reports include general ledger for Bishop customers and service bureau clients, stock transfers and terminal input listings.

I/O

Printers, plotters, point-of-sale, COM and much more—in **Computerworld's** August 31st Special Report.

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Image Problem Affects Minis

(Continued from SR/30)

and their product scope expands. They will be forced to address all of the above points to maintain market share. DP managers must also change their view of minis and mini suppliers. Their budgets are being scrutinized and the hot issue today is productivity.

Companies will have to consider specialized processing capabilities in some areas to maintain or increase their market position. The mini industry is leading this change process. A mini today is more than a mini. It is a necessary element for senior management to use in providing direction and control during the 1980s.

Davis is a branch manager with Systems Engineering Laboratories, a subsidiary of Gould, Inc. in Greenbelt, Md. He is also the executive vice-president of the Baltimore Chapter of the Data Processing Management Association.

Overcomes British Export Laws

Mini Turns Fish Story Into Lucrative Business

Special to CW

This is a story involving a minicomputer, the Middle East and $8,000 worth of smoked trout.

It is also a story of how that minicomputer helped a four-year-old export company satisfy its customers and stay ahead of tough British export laws.

During his travels between the British Isles and the Middle East, British Airways pilot Keith McKenna developed a plan to form an export business that would supply British goods to the Arab states. McKenna's intensive survey revealed that not only was the Gulf market ripe for development, but also that there was a real demand for fresh foods — and there was no existing competition!

This is where the $8,000 worth of fish came in. As a result of McKenna's initial inquiries throughout the Arab states, he received an order for trout from a customer in the city of Dubai. From this single order, King's Barn Exports was launched. Soon this fledgling company was swamped with orders from customers from all over the Middle East and from other areas ranging from Hong Kong to Barbados.

Success, however, is not without its own peculiar problems.

The food export industry is one of the most regulated businesses in the British Commonwealth. Special purpose documents are required for various reasons. For example, documents must be provided to comply with air freight regulations, others specify the product's country of origin, and still others are needed to meet important requirements at the destination site.

Requires Quick Turnaround

In addition to the sheer volume of paperwork, the nature of the business requires that order turnaround time be short. Since the necessary papers must either accompany or precede the order, the documents must be generated quickly — especially when orders must be filled within 24 hours.

To further complicate matters, the forms must be completely accurate. If they are not, the shipment of the entire consignment might be delayed. More importantly, any delay of a shipment of perishable items might cause spoilage, resulting in a substantial financial loss to the exporter.

Within four years, the firm's sales volume exceeded $2,000,000 annually. By this time, the exorbitant quantity of paperwork — which had to be produced on a tight schedule and with 100% accuracy — had become a real hardship and an overwhelming burden upon the company and its staff.

"Data was hand-typed onto each document and then thoroughly checked for accuracy. Often, we worked past midnight to process the paperwork," McKenna noted.

Computerization of King's Barn export business offered the most viable alternative — but only if the conversion could be accomplished quickly and at a realistic price.

After an intensive feasibility study, a computer consultant recommended the purchase of a minicomputer from MCS Mini Computer Systems of Maidenhead, England, a subsidiary of Mini Computer Systems, Inc., Elmsford, N.Y. Delivered in February 1979, the Micos 100 provided 10M char. of disk space and included two terminals and a Diablo daisy wheel printer. Not surprisingly, the selection of the printer was a major consideration.

"It is important for us to possess the capability of producing manual-type quality of script writing," McKenna pointed out. "This helps our customer to retain a sense of personal identification rather than feeling as if they were just a cog in the machine."

King's Barn Exports' investment in hardware and software amounted to approximately $60,000. Following four weeks of testing, the system was placed on-line and became fully operational.

Immediate Results

Installation of the computer yielded immediate results. The increased efficiency of the Micos 100 and its capability of quickly calculating and printing individual price lists enabled the company to expand its range of products from 200 to more than 2,000. This transformation was accomplished practically overnight.

The expanded product list, coupled with the ability to almost instantaneously derive error-free calculations allowed the company to accommodate increased demand from existing customers, and at the same time absorb a prodigious leap in orders from new customers.

Short-notice, special orders and heavy seasonal demand could now be handled almost routinely.

Nor did documentation requirements present an unsolvable problem. Information pertaining to each consignment could be entered into the system — the computer, in turn, automatically generated all necessary forms, without error.

Route planning, coordination of shipping and the timing of all operative steps of the export cycle became so efficient that the company now had time to devote to customer relations. A customer query service was established to provide error-free quotations. Greater efficiency of operation and the reliability of customer data helped to enhance the company's image.

Unlike many firms that employ a minicomputer to handle payroll and accounting functions, King's Barn Exports believed that using the system solely to handle export operations would more than justify its cost. The company's experience with the system has proven the validity of this opinion.

To utilize the full potential of the Micos minicomputer, the company plans to expand into sea freighting. The computer will be used to calculate the best means of optimizing purchased container space — a particularly complex procedure that must be applied to various bulk and weight ratios of various products.

It is presently estimated that the system, without additional equipment, could easily accommodate $2,000,000 of sea freight volume in addition to the more than $2,000,000 of air freight that it now controls.

"Its use has increased the efficiency of all office functions, cash flow has improved considerably, and the risk of loss resulting from shipment errors has been virtually eliminated," McKenna said.

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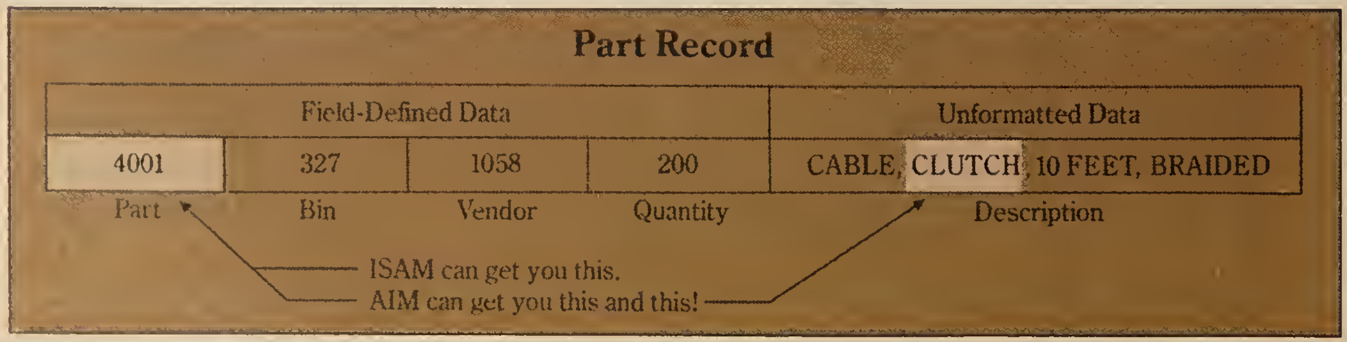
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Mini 'Stars' Behind Scenes at KETC-TV

Special to CW

ST. LOUIS — It is not surprising to see today's minicomputer operating in a manufacturing, distributing or retailing environment. These, and other installations, are typical situations for systems with the power and capabilities of a mainframe — but without the high price tag.

However, Basic Datasystems, Inc. of St. Louis recently launched the minicomputer into a field of celebrities. Utilizing a Basic Four Corp. Model 610 computer, Basic Datasystems installed a multifunction system for KETC-TV, Channel 9, in St. Louis — the public broadcasting system affiliate.

Unique Needs

The system is called Software for Television and Radio (Star) and handles both the traditional business requirements of the station and the totally unique needs of a broadcasting entity — particularly the specialized application of a publicly licensed operation.

A recent article in *The Wall Street Journal* pointed out the importance of publicly funded operations being managed as carefully and professionally as profit-oriented businesses.

And the current budget cutting approach of President Ronald Reagan's "Reaganomics" reemphasizes the need for station management to monitor all aspects of PBS station operations more closely than ever.

The more common accounting functions addressed by the system include purchase orders and accounts payable, accounts receivable, payroll and general ledger. However, general ledger has heavy fixed asset accounting requirements due to the wide variety and large quantity of technical equipment.

Monitors Progressive Costs

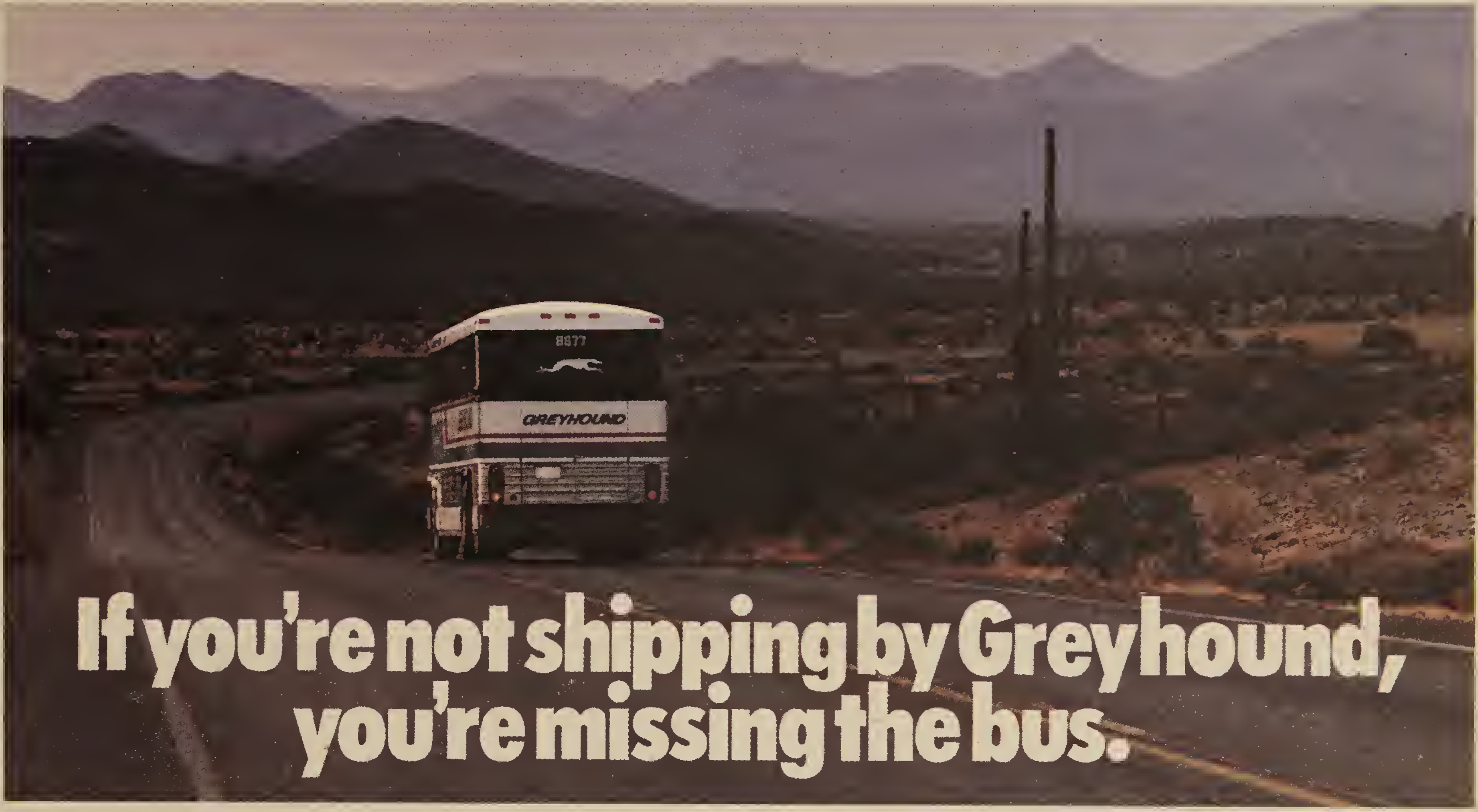
In addition, project cost (fund) accounting in the module is relied upon to monitor progressive versus actual expenditures for development of television and radio programs. The unique applications for public broadcasting entities fall into three major areas: membership, auction and program scheduling.

Most public stations obtain a large portion of their financial support from individuals "joining" as members. The person pays an annual amount, or pledges to make installment payments (or both) for a period of time.

Star's membership module not only maintains the pertinent information on each member in the station's data base and produces sorted labels for various types of mailings — program guides, renewal notices, installment due notices and other materials — but also accounts for all member cash receipts. Any payment received is entered on the screen and automatically posted to the member's account and general ledger. At any time, KETC's management reports can be produced giving installment member status and an installment aging.

Within the membership module, Star utilizes a pledge drive subsystem to monitor the membership drives held three or four times each year. The reports analyze the funds pledged during each break in the broadcast programming and show the program name as well as the particular talent.

Periodically, after a particular pledge drive is completed, a fulfillment report is produced indicating the amount of money actually received compared to the amount pledged. These two reports allow the KETC's development director to improve the results of successive pledge drives by selecting the programs and talent best suited to the particular market.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Mini Eases School District's Financial Woes

By Dr. Jonathan T. Hughes
Special to CW

RIDGEWOOD, N.J. — It is the beginning of another decade of the squeeze, the crunch and the cutback. Words like efficiency, accountability and performance, forgotten in the relatively free and easy growth years of the '60s, are slowly creeping back into the educational jargon of the '80s.

For the Ridgewood School District, the minicomputer is fast becoming one community's answer for quality yield at low cost.

Since the early '60s, Ridgewood has had a computer service center performing a variety of data processing functions.

The IBM System/34 here at Ridgewood has been a tremendous workhorse for the district in helping to keep skyrocketing costs for software and consulting at a minimum, while helping to turn out more and varied information to its users with a minimum of staff and supplies.

For instance, our System/34 helps us to schedule about 3,000 students twice a year complete with a conflict matrix and a host of printed reports for teachers and counselors. And, what used to take 11½ hours of computer time now is done in less than two with, at worst, overnight turnaround for each scheduling trial.

Daily Attendance

Daily attendance for homeroom and classes for all these students is done by computer-printed student cards fed through an optical character reader and read onto diskettes.

Report cards, class lists, student schedules, parent mailings, student transcripts, alumni reports, college acceptance lists and honor roll reports are but a few of the myriad of other reports and printings this mini churns out regularly.

Our system also serves in a variety of district administrative functions and research activities.

First, our complete program-oriented budget, including accounts receivable, accounts payable, payroll, medical plans and insurance is done on the System/34.

Employee records are also maintained and updated regularly. Third, a sophisticated statistical analysis system is avaliable for testing and district projects. It is a "research-type" system heretofore only available in large university computer centers.

Finally, we are planning to implement what we call our "pupil profile" system. This system will help us to sift through and organize the mountain of data available on each student in the district and cull from these sources information that is important and relevant for a classroom teacher or building principal in identifying specific curriculum needs for an individual or group of students.

Of course, all of these tasks come into sharper focus as an integral part of an overall planning system that links the information side of our schools (as generated by the computer) with the planning and evaluation schedules of our administrators.

Our comprehensive planning model is based upon two interrelated systems. The first is diagnostic: One that provides a mechanism for yielding critical information pertinent to the plan in question. The second system is prescriptive: One that provides a mechanism for proposing actions that are realistic in terms of the complex social and operating structure of a school system.

The cost? The original purchase of this mini (including two printers, an optical character reader and four CRT terminals) was less than 1% of the total school district budget for that fiscal year. In actual dollars and cents, the entire system costs about $29 per student to purchase and about $24 per student each year for maintenance, upgrading, staffing and supplies.

Indeed, if we had to contract for outside services for our scheduling, attendance, standardized testing and budget services alone, the cost would be about $40 per student, roughly a 66% cost increase for only one-half of the actual tasks performed by our workhorse.

Finally, the underlying theme behind maximizing our use of the mini is the premise that data and information are so distinctly different.

Data becomes information when it becomes usable and pertinent for the kinds of questions administrators, teachers and parents are increasingly asking. And, in a sense, it is how we use this data to make decisions, to interpret situations, to incorporate an action based upon our insights and to augment our collectable data with a variety of other uncollectable data that immediately upgrades sheer numbers to valuable school and community information.

Hughes is director of the Center for Computer Services and Information Management at the Ridgewood Board of Education, Ridgewood, N.J.

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Shared memory has been a popular answer to the problems of interprocessor communication, but as a potential single point of failure, it is unacceptable for NonStop™ operation. Even if the single point of failure problems could be overcome, contention for the shared resource creates an unacceptable bottleneck, severely inhibiting performance and limiting system expansion.

The volume of interprocessor communication required to support fault tolerant operation in a transaction environment is significant. Far too much to use typical I/O bus connections between processors without clogging the system and making it I/O bound. Even with Tandem's high speed 4 M Byte/sec I/O channel.

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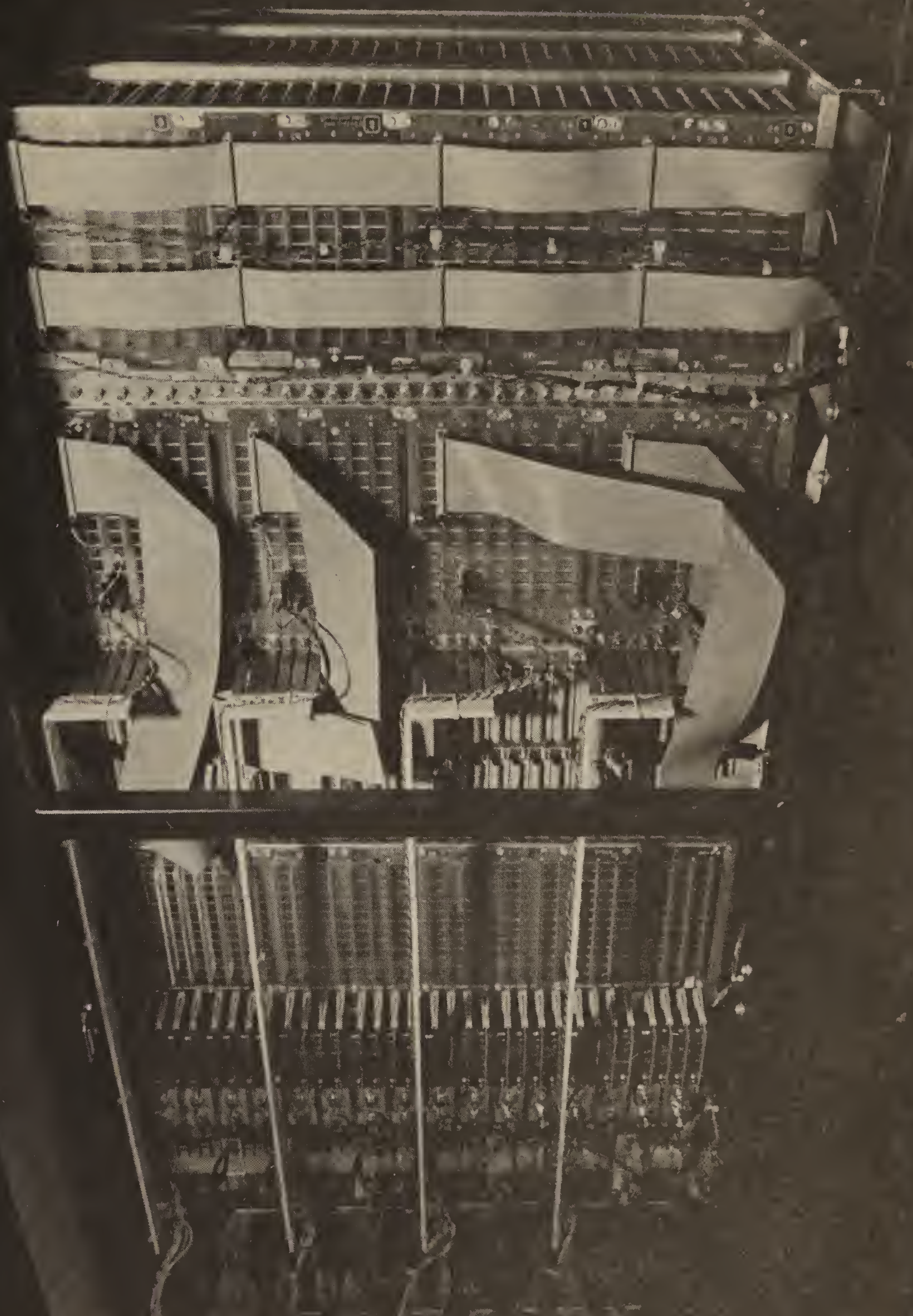

As a result, the Tandem NonStop™ System provides an aggregate interprocessor communications bandwidth of over 20 M Bytes/sec, even in a fully configured 16 processor system.

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Data Bits

DEC Cuts Prices On VT100 Options

MAYNARD, Mass. — Digital Equipment Corp. has announced price reductions on the advanced video portion and the printer port option for its VT100 CRT terminals.

The advanced video option, which extends the video presentation of the terminal, has been reduced from $320 to $150. The printer port for the VT100, which enables hardcopy terminals to provide permanent copies of the screen presentation, has been reduced from $385 to $225.

The price of a VT100 terminal with both advanced video option and printer port option has been reduced $330, to $2,525, DEC said from Maynard, Mass. 01754.

Lear Siegler Reduces CRT Display Prices

ANAHEIM, Calif. — Lear Siegler, Inc.'s Data Products Division has cut prices across the board for ADM 3A and ADM 5 dumb terminal CRT displays.

The list price of the ADM 3A was reduced from $895 to $595, while the ADM 5's price dropped from $995 to $645. The effective date for the price changes is Aug. 1.

The division is located at 714 N. Brookhurst St., Anaheim, Calif. 92803.

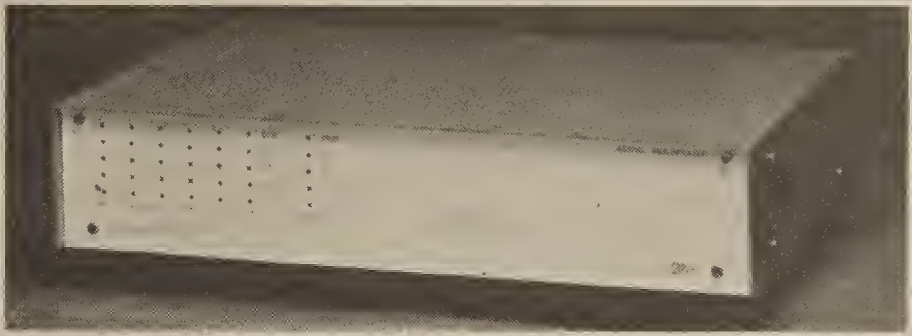
Q1 6800 Micro System Gains SDLC Capability

HAUPPAUGE, N.Y. — Q1 Corp. has added IBM's Synchronous Data Link Control (SDLC) networking capability to its 68000 microcomputer system. The capability, called Qnet, operates at 800K bit/sec.

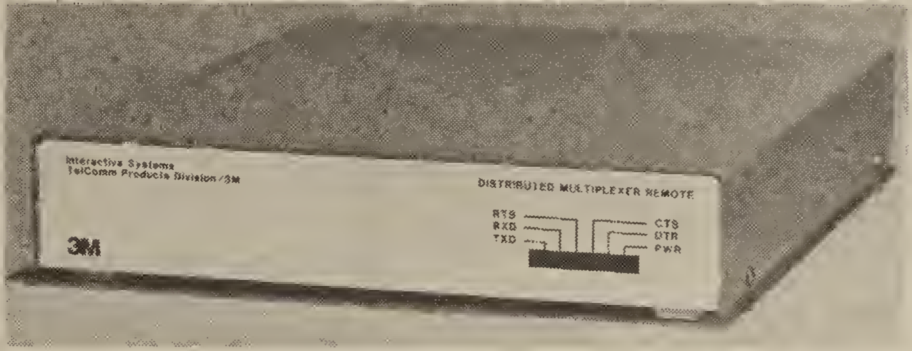
The addition of the Qnet to existing systems costs $1,000, according to the firm at 125 Ricefield Lane, Hauppauge, N.Y. 11787.

Handles Six Terminals

Local-Net Mux Offered by 3M



Head-end unit (top) and single-channel remote modem unit are integral Model 650 parts.



ST. PAUL, Minn. — An asynchronous distributed multiplexer system for transmitting data simultaneously between a computer and six remote terminals on local broadband networks has been introduced by 3M Corp.

The Model 650 system provides six full-duplex data channels between six I/O computer ports and up to six CRT terminals or printers anywhere along a coaxial-cable-based network.

The head-end multiplexer unit is designated the Model 651 MUX. The single channel remote modem unit is called the Model 652.

The package is said to enable the host processor to communicate with all brands of peripherals, so long as they employ the standard RS-232 communications interface.

Data transmission rates on the Model 650 system range from 75- to 9,600 bit/sec. The exact rate is switch selectable at each head-end unit. Multiplexer forward and reverse transmission occurs in the frequency ranges of 216- to 246MHz, respectively. All signal communications takes place on a single-conductor coaxial cable network, according to 3M.

The system is designed for use in data terminal networks, integrated workstations, point-to-point data communications and multiple central processor serial port applications. It can share a coaxial network simultaneously with other elements such as time-division multiplexer modems and video signals.

The Model 651 costs $2,500 and the 652, $990, 3M said. The company can be reached at P.O. Box 33600, St. Paul, Minn. 55133.

Interface Links Ascii, X.25 Units

SPRINGFIELD, Va. — A packet assembler/disassembler providing an interface between asynchronous Ascii devices and equipment that supports the X.25 synchronous interface is available from Dynatech Packet Technology, Inc.

Multiplex.25 is available in four- and eight-port versions. When connected in pairs over telephone lines, it operates as a statistical time-division multiplexer. The product can be used as a terminal concentrator for a variety of mainframes and minicomputers that support the X.25 synchronous interface.

It can also concentrate terminal traffic on single trunks to a data network, eliminating dial-out and dial-in modems and the monthly message unit telephone company charges.

The four-port version costs $995 and the eight-port version, $1,700, Dynatech said from 7664-A Fullerton Road, Springfield, Va. 22153.

'Triple Modem' Introduced

SAN JOSE, Calif. — Anderson Jacobson, Inc. has unveiled a "triple modem" for users "in a mixed communications environment of low and medium speeds, multiple Bell and Vadic Corp. protocols or for those who simply wish to send data at one speed and receive answers at another."

The modem communicates at speeds between 0 and 300 bit/sec with Bell 103/113 and at 1,200 bit/sec with Bell 212 or Vadic protocols. It also automatically selects the correct protocol when answering a call and performs self-testing.

The price for the modem is approximately $900, Anderson Jacobson said from 521 Charcot Ave., San Jose, Calif. 95131

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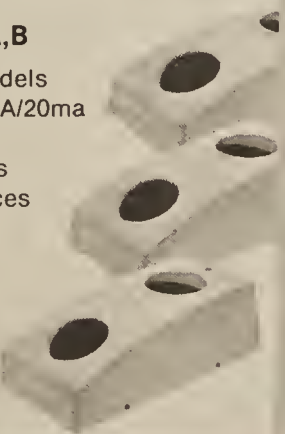

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Operator Time Cut 50%

Teletype 43 Enhancement Offered

PORTLAND, Ore. — An enhancement for the Teletype Corp. Model 43 Teleprinter — said to reduce operator time by at least 50% — has been introduced by Edge Technology, Inc.

The TLXD/81 replaces paper tape with an internal memory, adds a text editor for messages and automatically handles incoming and outgoing messages, Edge said.

Its features reportedly reduce communications costs and operator training requirements.

The TLXD/81 attaches to both a Telex and a TWX line or a Telex and a phone line, handling the activity of multiple terminals. The enhancement is said to fit completely inside the teleprinter.

Prices begin at $1,075 for a 16,000-char. version from Edge Technology, 2735 S.E. Raymond, Portland, Ore. 97202.

Switch Runs In Private, Carrier Nets

RONKONKOMA, N.Y. — A microcomputer-controlled automatic digital circuit switch is available from Intelligent Business Communications Corp.

The Automatic Digital Switch Model 5600 ADS with patented Time Division Matrix is said to be capable of switching low-, medium- or high-speed data circuits in private or common-carrier networks.

Reportedly fully modular and able to handle up to 256 universal telex/data terminations, Model 5600 ADS was designed for applications such as trunk concentrator, tandem network switch, local line switch, international leased circuit switch and computer port concentrator.

Three Modules

Bit-transparent to digital data up to 9,600 bit/sec, the system comprises three primary modules: call processing module, line terminator module and system power supply module. Also standard are the Camp-On Busy, Multiline Hunting, Test and Monitoring Facilities, Message Response, System Diagnostics and Auto-Start features.

Base price for the unit is $25,000 from the firm at 200 13th Ave., Ronkonkoma, N.Y. 11779.

CRT Unit Uses Seven LEDs

ST. LOUIS — A CRT terminal with an integrated palm rest and seven LEDs to indicate terminal status is available from Micro-Term, Inc.

The Ergo 2000 features a detached, low-profile keyboard and houses a green, nonglare screen. It tilts 25 degrees to accommodate different viewing angles, according to the vendor.

The CRT terminal costs $1,395 from Micro-Term, located at 1314 Hanley Industrial Court, St. Louis, Mo. 63144.

Emulator Links TI DS900s With CDC Cybers

CHAMBLEE, Ga. — Software said to allow Texas Instruments, Inc. DS990 computers to communicate with Control Data Corp. Cyber mainframes has been announced by Southern Business Machines, Inc.

The UT200/TI990 Emulator reportedly allows either interactive or batch communications. The software runs on a TI 990/10 or 990/12 computer under the DX10 operating system, the vendor said.

It allows the 990 to emulate a CDC User Terminal 200 remote job-entry station under the control of CDC's Intercom5 communications subsystem. The package permits multiuser access to multiple Cyber hosts concurrently and allows either Ascii or Binary Coded Decimal transmission.

The package costs $3,750 from Southern Business Machines, 2100 American Industrial Way, Chamblee, Ga. 30341.

TI Display Enhanced

LOWELL, Mass. — Digital Engineering, Inc. has added an application to its Retro-Graphics enhancement package for the Texas Instruments, Inc. Opti Model 940 alphanumerics display terminal.

Users will now be able to convert their present TI terminals from alphanumerics to graphics capability including point plots, pie and bar charts, mappings and curves, the firm said.

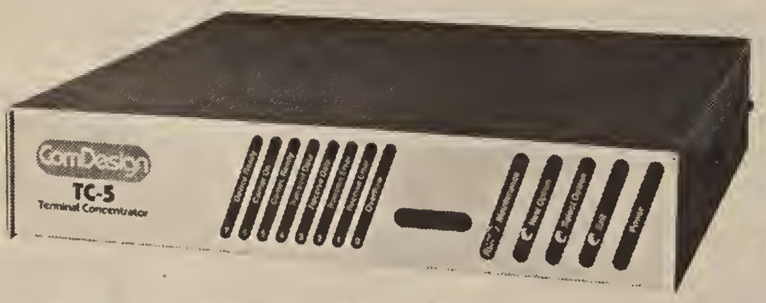
An optional light pen allows the TI terminal to emulate the Tektronix, Inc. 4010 Graphic Input Mode, according to the vendor.

The hardware is compatible with industry-standard software so users can utilize existing program libraries, the firm claimed.

The package comes with all the necessary connectors and accessory hardware and costs approximately $1,400, the firm said.

More information about the Opti 900 Model 940 Retro-Graphics package is available from the vendor at 630 Bercut Drive, Sacramento, Calif. 95814.

Bring it all together



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Magnetic Tape Terminals Provide System/34 Link

COLUMBIA, Md. — Mitron Systems Corp. has introduced magnetic tape terminals that allow data files to be input from tape terminals to the communications port of an IBM System/34.

The STD 1600 can also record data transmitted from the System/34 onto magnetic tape. Data exchange takes place at up to 19.2K bit/sec, the vendor said.

The interface handles data blocks up to 2,000 characters in nontransparent mode and up to 4,000 characters in transparent mode, according to the vendor.

A terminal designed for 1,200-ft reels sells for $13,750 and the 2,400-ft reel model costs $16,250, Mitron said from 2000 Century Plaza, 10632 Little Patuxent Parkway, Columbia, Md. 21044.

Intertel Adds Modems

ANDOVER, Mass. — Two modems with on-board ring detection and answer-back circuitry are available from Intertel, Inc.

The Model M1200 Federal Communications Commission (FCC)-registered modem for use on private or dial-up lines is compatible with the Bell Laboratories 202C, D, E, R, S and T devices.

The M2400 provides synchronous operation at 2,400 bit/sec and is compatible with Bell's 201 B/C and the Bell Dataphone 2400. Both models operate at either half- or full-duplex on four-wire unconditioned private lines and half-duplex on the DDD network.

The M1200 costs $695 and the M2400, $1,050, Intertel said from Six Shattuck Road, Andover, Mass. 01810.

IDS Unveils Breakout/Bit Error Unit

LINCOLN, R.I. — A combination bit error rate tester and EIA breakout panel for monitoring EIA terminal-modem interfaces has been introduced by International Data Sciences, Inc. (IDS).

The Model 65 Bit Error Rate Tester and Model 60 EIA Breakout Panel combine in a handheld, battery-powered product. Model 65 is a complete miniaturized modem test set said to be capable of performing bit error rate tests on synchronous and asynchronous data communications channels.

The Model 60 unit is the "Blue Box" EIA Monitor and Breakout Panel. Together, the units are called the "Red Box." The Model 65/60 costs $915, battery charger included. Purchasers must specify recharger Model 22 for 115V application or Model 23 for 230V application. Delivery is 60 days from IDS at 7 Wellington Road, Lincoln, R.I. 02865.

Modem Runs Short Distances

SILVER SPRING, Md. — A synchronous limited-distance modem that operates in full-duplex mode is available from Rixon, Inc.

The LDM720 operates at speeds ranging from 1,800- to 19.2K bit/sec. It can be installed in point-to-point or multipoint systems on both two- and four-wire nonloaded metallic circuits ranging up to 20 miles in length, the vendor said.

The modem is equipped with test circuits that are selected by front panel switches. When used in conjunction with the front visual indicators, these switches make it possible to test the modem, the terminal and the metallic line.

The stand-alone unit list price for the LDM720 is $495, Rixon said from 2120 Industrial Parkway, Silver Spring, Md.

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Originate/Answer Triple Modem

First there's Racal-Vadic's new VA3480 triple modem. Actually, Ma, it's six modems in one... a VA3400, a 212A and a 103 with automatic originate and answer. Thanks to the built-in microprocessor, the VA3480 can automatically call any VA3400, 212A or 103 remote modem, with the central computer maintaining complete control, including selection of high or low speed modes, and modem ID. In the auto answer mode, the VA3480 changes into a VA3400, 212A or 103, depending on which type modem is calling. It's really a "do everything" modem, Ma.

Single/Multiline Automatic Dialer

The other card is the new VA811 Multiline Automatic Calling Unit. You can house one of these dialers and up to 7 triple modems in Racal-Vadic's VA1616 chassis, which takes up only 7 inches of rack height. 4 of these chassis mount in a 7-foot rack cabinet, making it possible to control 28 triple modems from a single RS366 dialing port or, via an RS232C interface, using the VA831 adapter. It would take 28 of your dialers, and many racks of equipment to do the same thing. Hardly a fair comparison, is it, Ma.

VA1616 Chassis

VA1770
Rack Cabinet

VA3480 Replaces 8 of Your Modems

The VA3480 replaces 8 of your modems — the 103A/E/J, the 113A/B/C/D, and the 212A without altering hardware, software, or changing dial-up disciplines, and it can communicate with all versions of Racal-Vadic's VA3400 as well.

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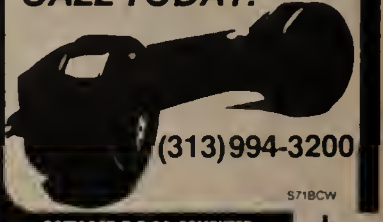

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Capacity (mb)	12 or 24	12-72	11.2	317.0	635.0*
Channel overrun	No	No	Yes	Yes	Yes
RPS misses	No	No	Yes	Yes	Yes

Intel's Comparison of Its Fast-3805 vs. IBM's DASD Models

PHOENIX — Intel Corp. last week unveiled an entry-level version of its Fast-3805 semiconductor disk, designed to free IBM direct-access storage disks from paging and swapping tasks.

The 3815 intelligent memory system is geared for IBM 4300, 370/158, 370/168 and 30 series systems running under the VM operating system. However, the 3815 and previously introduced 3805 will reportedly soon be able to function under the DOS/VSE operating system as well, Intel said.

Like the 3805 introduced last year, the entry-level 3815 is a fast paging and swapping device that is used in conjunction with the IBM 3350 and yet to be delivered 3380 disk drives. Basically, the semiconductor disk frees the IBM or similar rotating storage devices from paging and swapping chores, allowing the disks to be used just for data storage, an Intel spokesman said.

Normally, a user interested in paging would dedicate an entire 3350 drive to the task. To keep transfer and access times within reason, the user usually utilizes just a few of the disk's initial tracks, leaving the rest blank, the spokesman said.

By substituting the Fast-3815 for the 3350, a user can reduce system response time, increase the number of on-line users and improve system throughput, he claimed.

Since the 3815 is semiconductor-based and IBM's disks employ moving arms with relatively slow access speeds, the Intel system is about 10.5 times faster and has up to 1.3 times the transfer rate than the fixed-head option 3350. It also has 12- to 24 times the data capacity, the spokesman continued. Compared with the 3380, the semiconductor system provides 18 times faster access and almost twice the transfer rate.

In addition, the Fast-3815 has up to twice the capacity, six times the access speed and 1.3 times the transfer rate of IBM's 2305 series of drums, which are another storage alternative, the spokesman noted.

Standard Features

Standard features of the 3815 intelligent memory system include a control unit and motor generator, on-board maintenance such as soft error scrubbing and dynamic reallocation of memory in place of hard errors and an on-board Intel 8086 microcomputer. The 3805 and 3815 also incorporate what is said to be the first commercial use of multiple-bit error detection and double-bit correction.

Unlike its predecessor, which is geared for environments with paging rates exceeding 225 page/sec, the 3815 is aimed at a paging load of 35 page/sec or more where 3350s are the primary paging devices. While the 3805 is incrementally expandable to 72M bytes, the 3815 has a storage ceiling of about 24M bytes, the spokesman explained. Finally, the 3815 has an access speed of .8 msec, twice that of the 3805, and is available with one controller instead of the 3805's two.

Like the 3805 introduced last year, the entry-level 3815 is a fast paging and swapping device . . . The semiconductor disk frees the IBM or similar rotating storage devices from paging and swapping chores.

However, both systems have an optional programmable native mode and two-channel switch, the spokesman added. And the 3815 can be field upgraded to the capabilities of a 3805.

Sale and Lease Prices

The Fast-3815 costs about 60% less and costs 43% less to cool than an IBM 3350/3380 minimum configuration, the spokesman said. The purchase price for a system with one controller and 24M bytes of memory is $144,000 or $6,000 per 1M byte. A one-controller 12M-byte system sells for $84,000. The 3815 can also be leased for $4,450/mo or $2,550/mo for 24M- and 12M-byte systems, respectively.

The Native Mode option sells for $12,000 or leases for $400/mo, the spokesman pointed out.

Additional information on both systems can be obtained from Intel's Commercial Memory Systems Operation, 2402 W. Beardsley Road, P.O. Box 35900, Phoenix, Ariz. 85069.

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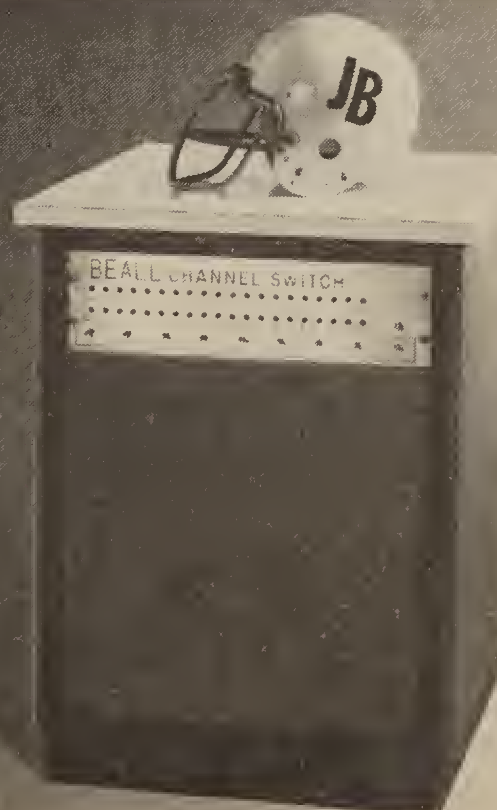

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For Data Streaming Disks

MPU-Enhanced Transport Bows

MONROVIA, Calif. — Kennedy Co. has announced a series of microprocessor-based enhancements to the firm's Model 6809 data streamer transport that provides diagnostics, self-testing and trouble-shooting features.

Designed for Winchester-type disk backup, the transport operates at 100 in./sec in the streaming mode and 12.5 in./sec in the start/stop mode, the vendor said.

The unit uses the microprocessor to control tape motion using algorithms stored in an on-chip progammable read-only memory. The microprocessor calculates the radii of the tape on both reels and supplies servomotor power to maintain a constant 8-oz. tension.

Processor-based routines also control tape acceleration and deceleration ramps during start/stop periods. Other routines provide soft loading and unloading to prevent tape breakage, the vendor said.

The price of the Model 6809 data streamer transport with integral formatter begins at $2,490, the vendor said from 1600 Shamrock Ave., Monrovia, Calif. 91016.

Harris Lowers Price Of 675M-Byte Disks

FORT LAUDERDALE, Fla. — Harris Corp.'s Computer Systems Division has discounted the prices of its 675M-byte disks.

The Model 5660 fixed-module disk drive with universal disk controller that formerly sold for $71,260 now costs $48,000. And the Model 5661 additional fixed-module drive, without controller, has been reduced from $61,860 to $40,000.

Up to eight fixed-module drives can coexist on a single universal disk controller, offering a total unformatted storage capacity of 5.4G bytes per controller, a spokesman noted.

In addition, the controller allows users to mix the 675M-byte disks with up to seven more disks of varying capacities.

Both the 5660 and 5661 are manufactured by Control Data Corp. for Harris, which is located at 2101 W. Cypress Creek Road, P.O. Box 6200, Fort Lauderdale, Fla. 33310.

Power Unit Boasts 5kVA

NUTLEY, N.J. — Nova Electric Manufacturing Co. has announced a 5kVA uninterruptible power supply designed for processors, process control, telecommunications and security systems.

The unit, called the 5kVA Taurus, produces a sine wave output with less than 5% total harmonic distortion and a built-in solid-state transfer switch, the vendor said.

Uninterruptible power supplies start at $8,280, the vendor said from 263 Hillside Ave., Nutley, N.J. 07110.

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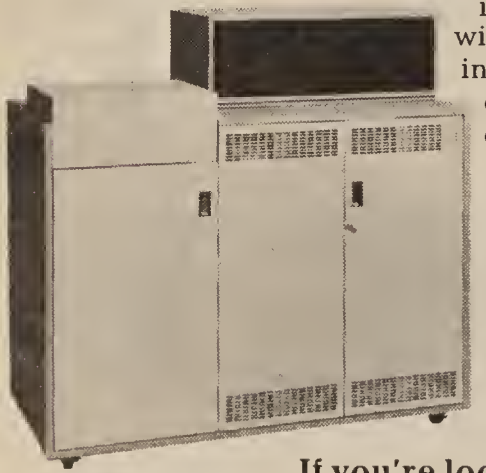

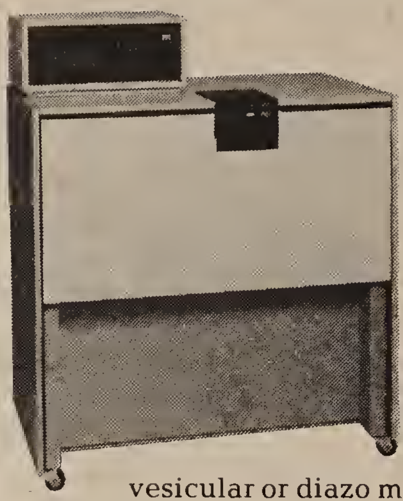

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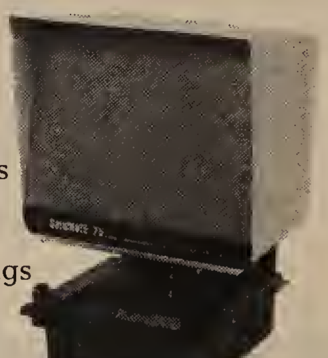

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WOODS HOLE, Mass. — Millions of suntan-lotioned, vacationing people from points all over the U.S. annually descend upon Cape Cod and its islands to eat, swim and frolic in the Northeast sun.

While the sheer numbers of these vacationers may occasionally cause headaches for the year-round residents and businesses, the company that has been providing transportation to and from the islands of Martha's Vineyard and Nantucket for four decades has found a cure for transportation migraines.

The Woods Hole, Martha's Vineyard and Nantucket Steamship Authority, based here, installed a minicomputer to handle real-time reservations and boarding tasks. Last year, for instance, the system scheduled 1.6 million passengers, more than 230,000 automobiles and more than 47,000 trucks, according to Jack Busch, computer systems manager for the Authority.

The Data General Corp. Eclipse system consists of a C/330 processor with 512K bytes of memory, two 96M-byte disk drives, one tape drive, a 300 line/min printer, six Dasher terminals and 20 Dasher CRT terminals. The authority also has a recently installed DG Nova 4X system with 256K bytes of memory that is used for accounting, payroll, general ledger and other business functions.

Presently, the authority owns five vessels, each of which carry approximately 700 passengers and 50 vehicles, Busch said. The boats travel 365 days a year and during peak seasons make a total of about 40 trips daily.

Prior to Eclipse

Before the authority installed the Eclipse, reservations were recorded manually on a trip list specifying the passenger's name, telephone number, destination, date, time and size of vehicle. The request was held aside for seven days, until payment was received, then a boarding pass and ticket were written.

Problems with this method, however, included the use of only one trip list among several reservationists, an escalating bookings backlog and duplicate reservations, Busch explained.

In November 1978 after considering a number of vendor proposals, the authority installed the Eclipse system. The computer ran in parallel with the manual system for about four months until it went fully operational in February 1979, an authority spokesman said.

One Dasher terminal was installed in each of the authority's

(Continued on Page 65)

Complements Manman Package

HP 3000 Gets Graphics System

LOS ALTOS, Calif. — ASK Computer Systems, Inc. has developed a business graphics system that complements its Manman manufacturing and financial management software package for Hewlett-Packard, Co. 3000 users.

The Manman Integrated Business Graphics System reportedly produces a variety of line, bar and pie charts that are produced by retrieving information on-line from the Manman data base.

The user can obtain information in graphics form directly from the data base without interacting with the system, except to select the desired chart from a set of menus, a spokesman noted.

Charts Dollar Commitment

The Manman Integrated Business Graphics system is said to chart purchase order dollar commitment, vendor performance, work-in-progress summary, work center capacity, gross requirements, resource capacity and projected inventory value.

The system reportedly allows users to visualize general ledger information, including actual versus budget, year-to-year comparison, revenue summary, net profit summary, percent of sales analysis, expenses as a percent of budget and actual-versus-budgeted expenses by account.

The package also includes HP's DSG/3000 software utility tool that is said to allow programmers to design their own charts, and ASK's Manman graphics program that, in conjunction with the HP tool, draws from the Manman data base to produce a graph. With the graphics CRT termial, users

(Continued on Page 65)

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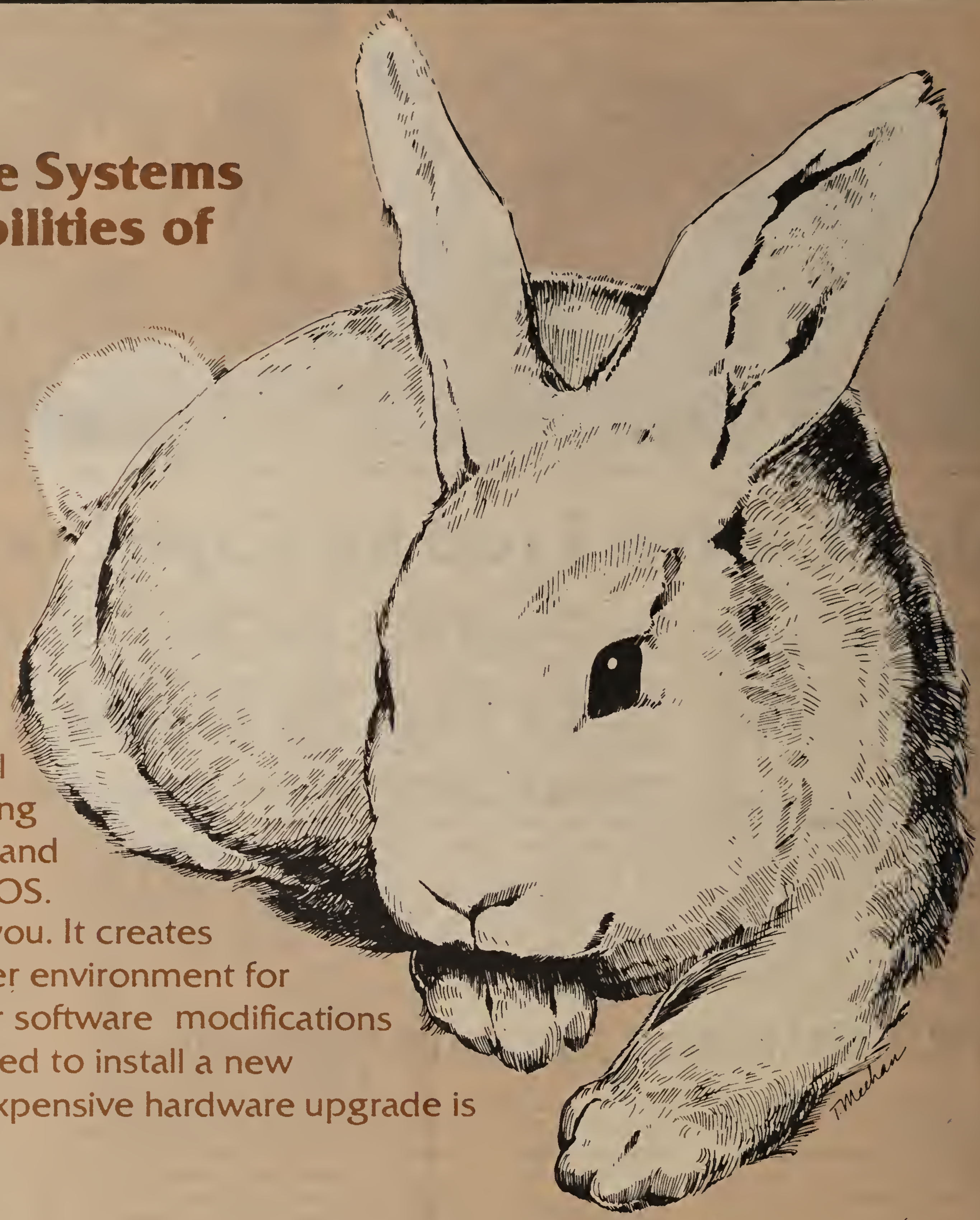

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With 16K to 2M Byte Choice

Plessey Memory Line Targets Intel Users

GAITHERSBURG, Md. — Plessey Microsystems Corp. has announced a line of memory products that offers up to 2M bytes of memory for Intel Corp. Multibus-based computer systems.

Announced as a range of memory products, users have the choice of between 16K- to 2M bytes of memory. For users requiring a range of random-access memory (RAM), Plessey has announced the PSM512, which offers 512K bytes of memory with error detection and correction circuitry on the board, which operates in either an 8-bit or 16-bit architecture, the vendor said.

Memory products cost from $4,750. Versions with and without error correction code, depopulated to 384K-, 256K- and 128K bytes are also available, the vendor said.

For smaller systems, the PSM 064 offers 64K bytes of dynamic RAM in an 8-bit or 16-bit architecture. It can be depopulated down to 16K bytes and is priced from $550, according to the vendor. For users requiring nonvolativity, the PSM 6463 has 64K bytes of Cmos RAM with on-board battery backup. The batteries are charged during normal operation and, in the event of a power failure, data will be retained for 350 hours. Depopulated versions of 16K- and 32K-byte boards are available. The units cost from $2,995, the vendor said.

For larger amounts of nonvolatile memory, Plessey offers the PBM 80M, a bubble memory available in 256K-byte increments up to 2M bytes. The memory consists of a controller board that handles up to eight storage boards.

The software handler system is included for $7,000, the vendor said from 19546 Clubhouse Road, Gaithersburg, Md. 20879.

Emulex Adds Disk Controller

SANTA ANA, Calif. — Emulex Corp. has announced a disk controller that permits users to mix different types and sizes of disk drives on a single controller.

The SC71 is functionally identical to the firm's earlier SC70 controller except it adds a programmable read-only memory that can be used to define up to 32 different combinations of four disk drives. The SC71 consists of two models, each designed to emulate the current large disk storage subsystems offered on Digital Equipment Corp.'s PDP-11/70.

The SC71 costs $7,950. SC70 units can be upgraded to the SC71 for $3,000, the vendor said from 2001 E. Deere Ave., Santa Ana, Calif. 92705.

Mini Carries Load on Cape

(Continued from Page 63)

ticket offices. The office here in Woods Hole received 13 CRT terminals, while the authority put three in Vineyard Haven, one in Oak Bluffs, two on Nantucket, and one at the ticket office in Hyannis, Mass.

Data Communications

Communications between each ticket depot and the CPU here is provided by 1,200 bit/sec modems, Busch said.

Now, the printers produce each trip list, ticket and boarding pass. The larger line printer is used to output management reports, statistics and batch ticket runs, he added.

The Eclipse operates under DG's Real-Time Disk Operating System. Additional software includes Infos data base oriented file management software, Idea interactive data entry/access software and Fortran IV.

The authority is now in the process of upgrading the software to add 10 additional reservation terminals, Busch pointed out. Future applications for the Nova X will include word processing and inventory control, the steamship authority spokesman said.

HP 3000 Gets Graphics Tool

(Continued from Page 63)

can program their own charts or revise the Manman selections, the vendor said.

The Manman Integrated Business Graphics System consists of an HP 7221T eight-color pen plotter that costs $7,250 or $5,300 without paper advance; an HP 2648A graphics CRT terminal priced at $6,250; and HP graphics utility software that is available for $6,300. The complete system is being offered for $25,470, the vendor said from 730 Distel Drive, Los Altos, Calif. 94022.

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Turnkey System Handles Retail Merchandising

SINKING SPRING, Pa. — A turnkey system for retail merchandising, inventory control and accounting functions has been configured by Business Computer Systems Corp. (BCSC).

Called the BCSC Retail Management System, the unit aids the retailer in purchase order management, merchandise distribution, merchandise ticket production, point-of-sale data capture, sales audits and general accounting features, the vendor said.

All software is written in Ansi '74 Cobol and was designed to run on Data General Corp's line of minicomputers that use the Interactive Cobol operating system.

Also available as part of the turnkey package are point-of-sale registers that can be polled on a daily basis and a merchandise marketing system that operates on-line, the vendor said.

Turnkey systems are priced from $75,000, the vendor said from 12 S. Hull St., Sinking Spring, Pa. 19608.

QT Printer Line Bows From SSI

FORT LAUDERDALE, Fla. — Southern Systems, Inc. (SSI) has announced the QT Series, a family of line printers available in 300-, 600-, 1,000- and 1,200 line/min versions that interface with Digital Equipment Corp., Data General Corp., Hewlett-Packard Co., Burroughs Corp., Texas Instruments Corp. and Perkin-Elmer Corp. processors.

The printers are available for parallel, synchronous serial or asychronous serial operation. Features include operator-changeable bands, swing-open band gates, a diagnostic display and membrane touch controls, the vendor said.

The 300- and 600 line/min printers are available with both 132-col and 198-col condensed formats.

Print Speeds

The QT-3 prints at 220 line/min with a 96-char. set, at 300 line/min with a 64-char. set and at 360 line/min with a 48-char. set.. The QT 6 prints at 440 line/min with a 96-char. set, at 600 line/min with a 64-char. set and at 720 line/min with a 48-char. set, the vendor said.

The QT-10 prints at 740 line/min with a 96-char. set, at 1,000 line/min with a 64-char. set and at 1,200 line/min with a 48-char. set. The QT-12 prints at 890 line/min with a 96-char. set, at 1,200 line/min with a 64 char. set and at 1,440 line/min with a 48 char. set, the vendor said.

The printers cost from $6,400 to $15,950, from Southern Systems, Inc., 2841 Cypress Creek Road, Fort Lauderdale, Fla. 33309.

Floppy Subsystem Fits DEC, Unibus

MOUNTAIN VIEW, Calif. — Scientific Micro Systems, Inc. has announced an RX02-compatible floppy disk subsystem for Digital Equipment Corp. PDP-11, LSI-11, VAX and Unibus processors.

The FWT0100/FWT1100 subsystem consists of two 5¼-in. single-sided or double-sided disk drives. It is hardware-, software- and format-compatible with DEC's RX02 floppy disk subsystems and DEC's RT-11, RSX-11M and VAX/VMS operating software, Scientific Micro claimed.

The unit can be upgraded to a Winchester-type disk unit to provide up to 35M bytes of memory, the vendor added.

A 1M-byte floppy-only system costs $3,900, an 8.9M-byte Winchester unit plus a 1M-byte floppy system costs $6,900, the vendor said from 777 E. Middlefield Road, Mountain View, Calif. 94043.

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Univac to Acquire PCC Base

BLUE BELL, Pa. — Sperry Univac and Pertec Computer Corp. (PCC), a subsidiary of Triumph Adler, have signed a letter of intent whereby Univac will acquire PCC's base of data entry equipment in the U.S. and Canada.

The acquisition will improve Univac's opportunities to market additional products and will emphasize the firm's commitment to the data capture and distributed processing marketplace, according to Univac President Joseph J. Kroger.

The PCC data entry base is being sold because of current interest rates, according to Ryal Poppa, PCC's chairman, president and chief executive officer.

When the transaction occurs, probably about Sept. 1, Univac will provide maintenance and support for PCC's CMC systems, the PCC 1800 and the XL line. About 800 users of 1,300 systems will be affected, Univac said.

The existing OEM agreement between the two firms, under which Univac markets PCC's 1900/10 distributed data system, will be continued and expanded to include PCC's data entry products.

A number of PCC sales, support and service employees will be asked to join Univac, the firms said.

The agreement is subject to approval by the boards of directors of both companies, according to the firms.

Smith Resigns at Basic Four

NEW YORK — Citing the disappointing performance of its Basic Four Information Systems Division, Raymond P. Kurshan, chairman and president of Management Assistance, Inc. (MAI), recently replaced that unit's top executive.

Theodore J. Smith resigned both as president of Basic Four and as a vice-president and director of MAI. He was replaced as Basic Four president by Stephen J. Keane, formerly president of MAI's Sorbus Division.

"Although many positive actions have been taken under Smith, we decided that a change in the division's management would better enable MAI's product development, manufacturing and domestic marketing operations to achieve growth in revenues and profits at rates closer to those attained historically," Kurshan explained.

MAI simultaneously named to the presidency of Sorbus Ronald A. Wallace, formerly Sorbus' senior vice-president of operations.

FCC Ruling on Telex Petitioned

UPPER SADDLE RIVER, N.J. — The Western Union Telegraph Co. has petitioned the federal courts to reverse a recent decision by the Federal Communications Commission (FCC) that would deregulate the provision of Telex terminal equipment by the International Record Carriers (IRC).

The major IRCs are ITT World Communications, Inc., RCA Global Communications, Inc, and Western Union International, Inc., a subsidiary of Xerox Corp.

A Western Union spokesman said that for more than five years his company had been calling attention to the IRC's anticompetitive practice of furnishing Telex terminals to their customers at a nominal charge or, in some cases, at no charge.

In February 1980, the FCC concluded that the IRC practice was unlawful, and it directed the carriers to establish cost-based rates for terminals. These rates were to be embodied in tariffs filed with the FCC, a spokesman said.

Reagan Policy Paper on Trade Recognizes the Importance Of High Technology and R&D

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The computer and electronics industries got some good news recently when the Reagan administration released its long-awaited statement on U.S. trade policy. Besides recognizing the importance to the economy of research and development and a healthy high-technology sector, the statement specifically mentions the "substantial contribution" of such service sectors as telecommunications and data processing.

Presented to Congress recently by U.S. Trade Representative William E. Brock, the policy paper is very general and does not provide many details on how the administration plans to boost U.S. trade. But it does include a number of points that heartened industry representatives here who have been fighting for years for more government recognition of the economic contributions of high-technology firms.

"Somebody's been listening," John Sodoloski, vice-president of the Electronic Industry Association's (EIA) Communications Division, said, commenting on the paper. "One of the things we've been preaching for a number of years is that high-tech electronics is to the last two decades of this century what steel was to the last two decades of the last century. It's the stuff that nations are built of," he stated, suggesting the administration now recognizes this point.

Similarly, American Electronics Association (AEA) Executive Jim Whittaker said, "looking at the statement as a whole I see . . . a recognition of how important technology and R&D is to our long-term trade competitiveness."

Whittaker, AEA manager of government operations, added "on the whole I think there are some good words for us" in the paper and said it demonstrates the administration's awareness of "the importance of going out and doing work on behalf of these industries, which are doing a good job for the country" as opposed, he said, to worrying about struggling or moribund industries.

Five Policy Components

The administration's 15-page policy paper, which declared "we will give top priority to trade," focused on the following five central policy components:

- Restoration of strong noninflationary growth to facilitate adjustment to changing domestic and international market conditions.
- Reduction of self-imposed export disincentives and better management of government export promotion programs.
- Effective enforcement of U.S. trade laws and international agreements.
- Effective approach to industrial adjustment problems.
- Reduction in government barriers to the flow of trade and investment among nations, with strong emphasis upon government and extension of international trade rules.

The paper also outlined policy approaches to a number of topics, including trade with developing nations, export controls on trade with communist countries and cooperation with Congress and the private sector in policy formulation.

Beyond that, the paper seems to indicate this administration, more than any other in recent memory, places great importance on high technology and R&D for both a

(Continued on Page 68)

Vendors Blame External Factors For Earnings Dip

Honeywell, Inc., NCR Corp., Burroughs Corp. and Control Data Corp. reported revenue increases between 8% and 18% for the second quarter, but in most cases the mainframers' earnings were negatively influenced by foreign exchange gains and margin pressures.

Honeywell reported revenues of $1.3 billion, up 18% from $1.2 billion in 1980's second quarter.

While net income rose to $71.4 million or $3.15 per share, $28.5 million or $1.25 per share was accounted for by gains in foreign currency exchange. Last year the gain from foreign exchange was three cents per share in the second quarter. During 1980's second quarter, Honeywell's earnings were $56 million or $2.51 per share.

Rate of Increase

"The rate of increase in second-quarter earnings will probably not continue for the second half, but the company still hopes to match 1980 earnings for the year," noted Edson Spencer, the firm's chairman and chief executive officer.

"Earnings for the quarter exceeded last year in spite of a drop in the operating income of European affiliates, caused by the strengthened dollar, and also in spite of the negative high interest rates on the residential housing market and outright computer sales in both the U.S. and Europe," he continued.

For the year to date, Honeywell's earnings were $123.7 million or $5.46 per share, up from $101 million or $4.53 in the same quarter a year ago.

Revenues for the half totaled $2.5 billion, up 8.8% from $2.3 billion in the second quarter of 1980.

(Continued on Page 72)

Iranian Assets Frozen for EDS

DALLAS — The Iranian assets set aside for the satisfaction of a $19 million award to Electronic Data Systems, Inc. (EDS) here will remain in the U.S. and not be part of the Iranian assets returned to the Middle Eastern nation, the Fifth Circuit U.S. Court of Appeals in New Orleans ruled recently.

Those assets earmarked for payment to EDS will remain indefinitely in the Marine Midland Bank in Buffalo, N.Y., noted EDS attorney David Bryant of the Dallas law firm of Hughes and Hill.

According to the agreement struck by former President Carter last January for the release of the 52 American hostages, the U.S. government agreed to transfer billions of dollars in previously frozen Iranian assets back to that government. EDS' claim is the only one of some 450 corporate claims outstanding against Iran that was not affected by the U.S. Supreme Court's decision earlier this month to uphold Carter's financial deal with Iran, the company's attorneys said.

On July 10, banks around the country

(Continued on Page 72)

Burroughs Plans Acquisition

DETROIT — Burroughs Corp. has signed a letter of intent to purchase Systems Research, Inc., a supplier of communications processors for use in computer-based data communications networks, display terminals and software systems for on-line data entry, processing and reporting.

If the acquisition is approved by the board of Systems Research, the company will become part of Burroughs' recently formed Communications Network unit.

With recent sales of $8 million, Systems Research employs 100 people, most of whom are engineers specializing in computer communications. The company also operates a data service center in Michigan.

Reagan Trade Paper Recognizes High Tech

(Continued from Page 67)

strong U.S. trade posture and a healthy domestic economy.

The paper said "surveys have indicated the U.S. has had a decline in research and development expenditures while other developed countries are increasing theirs. The U.S. is losing its technological lead, and this is bound to have serious consequences for the international competitiveness of U.S. products."

Under a section on services, the statement noted the "growing importance" to the U.S. of services, a sector the administration said "contributes" significantly to our exports.

"Services are also critical to exports of high technology," according to the paper, which pointed to the telecommunications and data processing/information industries as "among our most competitive U.S. enterprises."

But even such strong industries "face subsidized competition or restricted access in world markets," the paper said. "The administration is committed to addressing these problems through active negotiations with our trading partners bilaterally and multilaterally."

Addressing advanced U.S. technology, the paper said "as our industries mature and adjust to international competition, we will need strong performance in high-technology industries to maintain the U.S.' competitive edge. But," the paper continued, "trade in these goods frequently is distorted by various forms of government intervention."

The statement said existing trade agreements "do not adequately cover either a number of key sectors or certain types of intervention by governments." It promised future negotiations will build on existing codes "by extending the sectors and types of intervention covered by international discipline."

While general in nature, the paper does provide "the basic framework" for administration action on many of the pressing trade and economic issues facing the electronics industry, according to Oliver Smoot, vice-president of Computer and Business Equipment Manufacturers Association (Cbema).

"The commitment to a free trade approach to international trade is very heartening" if not unexpected, Smoot said. He added, "Now we at least know the background with which they will approach situations."

Big Question

Smoot, like several other industry representatives, said the big question is how much the administration is committed to backing its policy statement with concrete action. However, the Cbema executive said "we've been quite pleased with the openness of the Trade Representative's office and the Commerce Departments" to industry problems and concerns.

Similarly, Whittaker said the extent of the commitment is "unclear . . . We have to see what happens, but my sense of this is that they understand and apparently are willing to go to work [for high-technology industries] and that is encouraging."

Slightly more pessimistic on this point, the EIA's Sodoloski commented "they identify the problems quite succinctly and quite accurately [but] they don't necessarily say what they are going to do.

"I think the administration is quite rightly tied up with its own laissez-faire, free-enterprise, let-the-marketplace-decide philosophy, and that's terrific so long as everyone plays that way, but almost nobody else does," Sodoloski said.

Service Lists Purchases of Systems

LA JOLLA, Calif. — A Monthly Lead Sevice (MLS) said to provide up-to-date identification of computer and office automation equipment purchases in the U.S. has been announced by Computer Intelligence Corp.

MLS is offered on a subscription basis and gives customers detailed information regarding which companies have purchased exactly what equipment and where.

Monthly lead cards provide several types of information such as name, address and telephone number of the company purchasing equipment, type of software bought, brands and models of mainframes, micros, minis, personal computers, copiers, word processors and peripherals, the vendor said.

Variable price information is available from Computer Intelligence Corp. at 3344 N. Torrey Pines Court, La Jolla, Calif. 92037.

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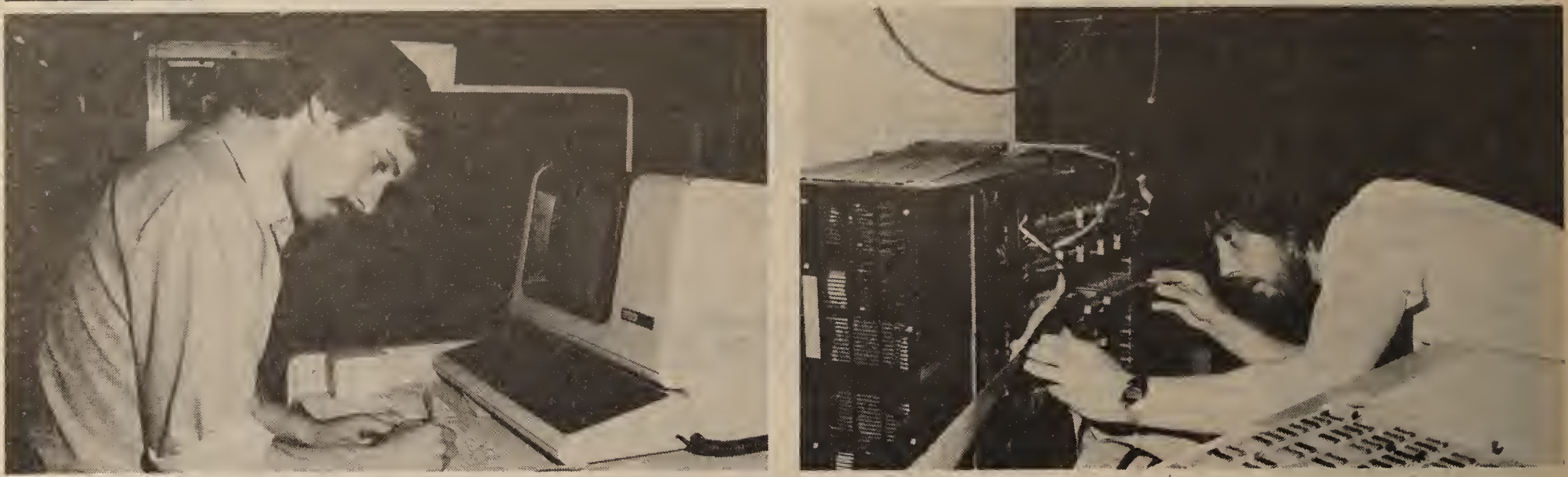


Workers at Digital Equipment, Ltd.'s plant in Ayr perform trouble-shooting, assembling and testing of PDP-11 minis bound for European markets.

Old Meets New at Scottish Plants

By Bill Laberis
CW Staff

SOUTH QUEENSFERRY, Scotland — Some employees at Hewlett-Packard, Ltd. here pass their lunchtime at the company social club a stone's throw from the plant, sipping on dark ale, watching television or, as many of the older women prefer, pumping coins into an electronic bingo game.

Others, the more active on the staggered lunch breaks, play squash on the company's courts or jog around the nearby fields and sheep-studded meadows. It is a classic case of the Old West meeting the New West at a plant where turnover and chronic absenteeism are almost unheard.

Up the road in Dundee, employees at the NCR, Ltd. plant are lined one behind the other at their desks, coats in hand and eyes fixed on the clock. At precisely 4:15 p.m., a bell sounds and within no more than 60 seconds some 850 workers have dashed from the sprawling, austere looking plant out to their cars.

The 850 workers are all who remain of the American-owned subsidiary that once employed 7,000 people in eight Dundee plants.

"We are both English-speaking countries, but much of the similarity ends there," an American computer manufacturing executive said here last week. "If you want to really exploit what is a truly rich labor pool, you have to learn to manage effectively within a social structure that is traditionally class-oriented, something the workers have long resented."

What a group of U.S. journalists, guests of the Scottish Development Agency (SDA), were shown is that modern American management techniques in computer manufacturing can be successfully modified to meet local labor needs while maintaining productivity and quality standards.

The SDA, British government and many local development agencies in Scotland are trying hard to lure U.S. computer manufacturers by touting what they claim is Scotland's underemployed, technically oriented labor force. The Scots are also dangling a comprehensive subsidies package in front of the U.S. companies in an attempt to get them to settle or expand here (see related story).

And certainly the wage differentials between the U.S. and Scotland are proving a strong drawing card for the American computer manufacturers, most plant managers conceded.

Typical Salaries

For example, figures available from the SDA show the salary for a typical computer operator in Scotland in 1980 was about $10,000, that of a programmer $12,300 and that of an entry-level software engineer $13,000.

"As more companies set up here there is an increasingly smaller pool of university grads to fill vacancies created by expansion," Peter Carmichael, managing director at Hewlett-Packard , Ltd., said.

"But we have a long waiting list for assembly workers and turnover overall is less than 3%, maybe a bit higher for upper-level technical workers and engineers. People here are simply loathe to move around like they do in the States."

The Palo Alto, Calif.-based company built its first Scottish plant in 1966 and is presently putting up its third major site expansion at a cost of $17 million. As much as $7 million of this expansion can be funded by a no strings attached government grant from the Department of Industry and certainly no less than $3.7 million.

The plant produces digital communications test equipment and modems and Carmichael said it is among the six most profitable of all HP's worldwide plants. He said the plant has also invested heavily in its in-house research and development staff and is regularly exporting original technology advances back to the U.S.

New Town Environment

Digital Equipment (Scotland), Ltd. opened a new plant in 1976 in Ayr, one of Greater Glasgow's five "new towns." Built after World War II to accommodate new industry, the new towns are planned communities designed to siphon off the bulging labor pools from the larger cities while providing the environment the government hopes Americans will find to their liking.

Digital bought its 65-acre site from the SDA and will receive a significant but unspecified government grant to help finance a new $6 million expansion to its present 300,000 square foot capacity.

The plant's 600 employees test and assemble the complete line of Digital's PDP-11 series minicomputers, using components produced at two plants in the Republic of Ireland.

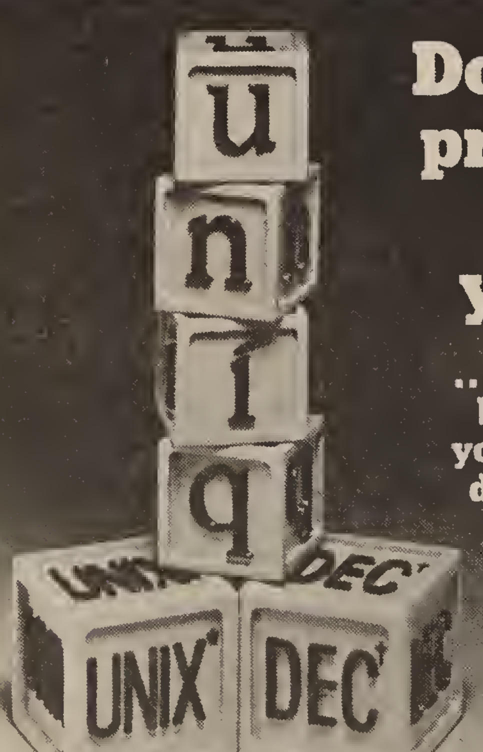
John Shankland, the plant's engineering director and a native Scot, also boasted of a "fantastically low turnover rate" and the availability of "a vast pool of skilled labor adaptable and eager to learn our way of doing things."

But all is not roses within the computer industry in Scotland. The SDA has promoted some failures, albeit not very large failures, and one American components manufacturer said the SDA's equity investment in his company "was something no other venture capital investor or bank would have touched."

The same executive said the proliferation of the electronics business to the degree the SDA has planned, coupled with an expected "Japanese invasion" of the local labor pool, will boost wage rates and quickly deplete what is "actually not an overwhelmingly large available skilled labor force.

"The absolute numbers of technical university graduates, especially in computer science and electrical engineering, is not all that great," he said.

"But in all, I really can't complain myself about doing business here. With existing tax laws, I have been able to make a good profit while growing annually and paying little or no [corporate income] tax. For now, it's OK."



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Cheap Labor, Subsidies, Market Potential

Scots Roll Out Tartan Carpet for U.S. Firms

By Bill Laberis
CW Staff

GLASGOW, Scotland — Scotland has rolled out the tartan carpet across the Atlantic, beckoning American computer companies to exploit its cheaper labor, ample government subsidies and a potentially huge European market.

Promising ready access to an increasingly rare commodity — "skilled labor and brains" — Scottish officials recently told a group of visiting American journalists that Scotland has thrown open the development doors.

"We want American development, the good, clean kind that characterizes the electronics industry," said James Scott, undersecretary of the Scottish Economic Development Department, who spoke at the headquarters of the Scottish Development Agency here. "And we are prepared to offer a financial package and quality, technically oriented labor force second to none."

Other Realities

But other economic realities are threatening to undo or at least impede the progress of Scottish computer industry development plans.

For one thing, the Republic of Ireland next door is offering what even the Scots admit is a more generous package of purely financial incentives. However, the Scots are equally quick to point out that Ireland's labor force is a predominantly agrarian-based one, while Scotland's is industrial — even though sheep outnumber people here.

In addition, the soft economy that has plagued Western Europe for the past two years shows no signs of getting any better and may in fact be worsening. Last month, ICL Ltd., Britain's giant mainframe manufacturer, laid off 5,000 employees in response to sputtering sales.

Nonetheless, American electronics and computer companies are setting up shop in Scotland in greater numbers each year. Many have ambitious growth plans (see related story).

Today one of every six Scottish technical workers is employed by a U.S. electronics company located mainly in the belt that spans from Edinburgh on the east coast and Glasgow, the former "gear-box of the British Empire," on the west coast. It is this area of roughly 100 square miles that Scottish officials contend is becoming the "Silicon Valley of Europe."

About 90% of the output of Scotland's 200 electronics plants is sold throughout Europe, with most of the small remainder shipped to the U.S.

At the root of the big government push to lure American computer companies to Scotland is the UK's unemployment rate, now at 12.6%, roughly twice that of the U.S. In parts of older cities like Glasgow, the unemployed comprise 20% or more of the work force, counting many skilled workers in their numbers.

Britain's Department of Industry has designated the economically hard-pressed districts as "special development areas." The designation enables any manufacturing or assembly firm to an automatic 22% outright grant toward the purchase of any building or fixed capital asset in one of those areas.

There are very few strings attached and the grants are processed expeditiously, according to both government officials and companies that have taken advantage of the grants.

In addition, investing or expanding companies in designated areas like the Glasgow-Edinburgh belt can negotiate for up to an additional 18% of start-up costs. In all, a computer manufacturer contemplating, for example, a $10 million capital outlay can get up to $4 million free from the government in grant form and is guaranteed at least $2.2 million. There is no upper limit on the size of the grant.

Boundaries Change

However, the boundaries of these designated development areas can and do change at the government's discretion, leaving some corporate planners feeling uncertain about what subsidies will be available in the future. Aberdeen, on the northeast coast, is no longer a designated area, having been recently blessed with an inflow of North Sea oil revenues.

The Scottish Development Agency (SDA), whose stated aim is "to promote investment in Scotland by the U.S.A.," is Scotland's biggest factory developer and landlord, owning more than 700 factories. These facilities and others the agency custom builds as "advance factories" are available to incoming computer manufacturers with purchase-lease options, the SDA claimed.

But many of the factories are too old and ill-equipped to accommodate a modern computer manufacturing operation. The SDA is particularly anxious to liquidate the older factories and two agency officials said privately these buildings are available at rock-bottom prices to Americans.

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Vendors Cite External Factors as Earnings Dip

(Continued from Page 67)

In Europe, Honeywell's 47% owned CII-Honeywell Bull, Inc. reported an operating loss, but the currency exchange gain offset that loss.

Likewise, NCR reported negative earnings largely because of gains in currency exchange. Earnings for the second quarter were $52.2 million or $1.94 per share, an 8% decline from 1980's second quarter earnings of $56.7 million or $2.12 per share. For the six-month period, NCR's earnings totaled $79.8 million or $2.96 per share, a 3% decrease from the $82.2 million or $3.08 per share earned during the comparable quarter of 1980.

Worldwide revenues advanced 8%, totaling $853.8 million, compared with revenues of $788.2 million in the 1980 second quarter. For the first half, NCR reported revenues of $1.6 billion, an increase of 10% from $1.4 billion in revenues for the first half of last year.

"If foreign currencies had remained at year-ago levels, the quarter would have been characterized by good revenue growth and a gain in net income," NCR Chairman William S. Anderson said.

Earnings Decrease

As expected, Burroughs reported a decrease in second-quarter earnings from last year's second quarter. Earnings were $31.3 million or 75 cents per share, a 49% decrease from the $60.9 million or $1.47 per share in the like quarter of 1980.

For the first half earnings were $53.5 million or $1.29 per share, a 51% decrease from the $108.5 million or $2.63 per share for the first half of 1980.

Burroughs Chairman W. Michael Blumenthal said the firm anticipated that second-half earnings would surpass last year's levels.

Commenting on the results, Blumenthal said "While incoming orders were somewhat below our expectations, backlogs continue at a high level, and we expect to see a beneficial impact on orders from such newly released products as the Ofis 1 office automation system and the S 6000 intelligent document processing systems."

Revenues Jump

Revenues at Burroughs during the quarter advanced 13% reaching $834.2 million, up from $735.2 million a year ago. For the first half, revenues were $1.6 billion, up 13% from 1980's first-half revenues of $1.41 billion.

From Minneapolis, Control Data Corp. reported a 27% increase in its computer business earnings due to an 11% revenue gain, improved operating margins and a lower tax rate from the prior year's second quarter.

For the second quarter, CDC's revenues from its computer business was $755.1 million, with consolidated revenues reaching just more than $1 billion. For 1980's second quarter, computer revenues reached $678.7 million and consolidated revenues were $934 million.

Consolidated corporate earnings for the latest quarter were $43.3 million or $2.27 per share, with the computer portion contributing $30.3 million in earnings. For the same period last year, CDC reported earnings of $39 million or $2.25 per share, with the computer business comprising about $24 million in earnings.

For the first half, CDC's total revenues were $1.98 billion, up from $1.8 billion in the prior year's first half.

Earnings for the first six months reached $83.6 million or $4.39 per share, up from $74.2 million or $4.28 per share in the same period a year ago.

Assets Frozen for EDS

(Continued from Page 67)

electronically transferred nearly $2 billion in Iranian funds to the Federal Reserve Bank of New York. From there $1 billion was scheduled to have been transferred by July 19 directly to Iran, with the remaining $1 billion slated for a special escrow account in a foreign central bank.

However, EDS probably will not be able to collect its award, granted last May [CW, May 12] until the international arbitration tribunal set up to hear claims rules on EDS' case.

That tribunal may decide the claim stands and authorize the release of the funds to the firm or require EDS to again prove its claim that Iran breached its contract to EDS for services rendered.

EDS' case against Iran was for breach of contract. In 1976, EDS entered into a three-year contract with the Iranian government, then headed by Shah Mohammad Reza Pahlevi, to install and operate DP services for Iran's national health insurance and social security system. In 1978, after nonpayment by the government for several months, EDS ceased providing services.

Executive Corner

- Tracy Licklider has been promoted to vice-president of operations and Stephen Bayle has been promoted to senior manager of product development and administration at Software Arts, Inc.
- Charles L. Smith has been promoted to vice-president of manufacturing at the Naked Mini division of Computer Automation, Inc.
- Vir Dhaka has been named a vice-president in the Electronics Division at Xerox Corp.
- Digital Pathways, Inc. has appointed John R. Anderson to the new position of vice-president of marketing and sales.
- Ross Seider has been appointed vice-president and Thomas L. Phinney has been appointed a member of the technical staff at Concord Data Systems, Inc.
- Comserv Corp. has named James Borgstrom vice-president and general manager of the processing services group.
- Frank Sordello has been promoted to the newly created position of corporate vice-president of technology at Memorex Corp.
- Dr. Harvey A. Freeman has joined Architecture Technology Corp. as vice-president of engineering.
- Julius L. Ross has been named vice-president of finance and administration at Software Design Associates, Inc.
- William R. Roach has been appointed president and chief executive officer at Advanced Systems, Inc.
- Jesse F. Lancaster has been promoted to president at Dynatech Data Systems Co.
- J. Neil Smith has been appointed president of Station Business Systems, effective Aug. 1.
- Amtel Systems Corp. has named Don McCook to the new position of vice-president of marketing.
- Dr. David E. Crockett has joined Dataquest, Inc. as senior vice-president for Information Processing Industry Services.
- Five senior level appointments have been announced at Automatic Data Processing, Inc.: Richard Patterson and Fred S. Lafer have been named senior vice-presidents; David Perlman and Frank Edelstein have been named corporate vice-presidents; and Art Weinbach has been named vice-president of finance.
- National Semiconductor Corp. has appointed A. J. Moyer vice-president of finance.
- Data Packaging Corp. has appointed Richard L. Morningstar vice-president and general counsel.
- Robert C. Williams has been appointed to the new position of vice-president of planning and technology at Ex-Cello-O Corp.

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ASK Going After Management Graphics Mart

By Robert Batt
CW West Coast Bureau

LOS ALTOS, Calif. — ASK Computer Systems, Inc. has introduced what it claims is the first business graphics system designed to completely integrate with the user's management information system (see story on Page 63).

Known as Grafman, the product is intended to complement ASK's Manman manufacturing and financial management software system. According to the company the user can obtain information in graphics form directly from the data base without interacting with the system except to select the desired chart from a set of menus.

Tom Lavey, ASK's vice-president of marketing, said, "We have designed a prepackaged solution for management's graphics needs. We are not just giving a programmer some tools with which to design graphs.

"Instead we're offering an easy to use system that provides the communicative power of a visual format and helps managers use and understand more of their computer-generated data."

Condensed Form

The company said the addition of Grafman enables manufacturers using Manman systems to obtain reports and other types of data in condensed visual formats. It claimed that all the information is pulled from existing data bases and is already integrated into the system so that as soon as a transaction takes place the data base is updated.

ASK estimates that the world market for integrated business graphics systems is expected to grow from a current $238 million annually to $959 million by 1984 with middle and upper management accounting for roughly 85% of the usage, of which financial planning management accounts for more than one-half.

"Our overall thrust will be at the factory of the future marketplace where managers are looking at ways to increase productivity substantially. To date, business graphics in this area has been limited to material handling and cost accounting functions. We are looking at other application areas that can be used to integrate other hardware tools," Lavey said.

Such ways of collecting data to increase productivity, he said, included quality control and distribution.

ASK said that up until now, the greatest drawback to the widespread use of business graphics has been the relative lack of user-friendly systems. The company claimed Grafman was an advance because it automatically produced a variety of line, bar and pie charts with minimal prompting from the user.

Major Functions Covered

Applications reportedly include major functions within manufacturing companies. ASK has a user base of around 200 customers — more than half of which are Fortune 500 corporations. It is hoping to use the new graphics system to bolster its financial position, which last year saw revenues climb to $13 million.

Programs supplied by the firm are in essence data gathering programs using formatting tools supplied by Hewlett-Packard Co. HP provides the output mechanism with ASK adding the input and processing systems.

In the case of Grafman, the system consists of an HP 7221 eight-color graphics plotter and HP's DSG/3000 software utility tool that allows programmers to design their own charts. The complete system is being offered for $25,470 from ASK, 730 Distel Drive, Los Altos, Calif. 94022.

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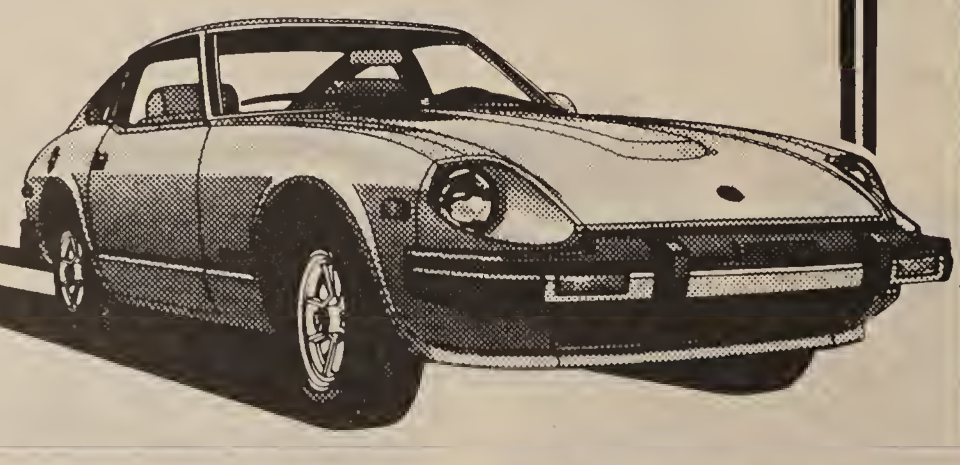

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Equivalent to graduation from a four year college is required. Experience can be substituted for up to two years of the required education on a year for year basis.

Final filing date: **Aug. 24, 1981, 5:00 p.m.**

Send resumes to:

James Morris, Project Manager
Division of Information Systems
California State University, Fresno
Fresno, CA 93740

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You should possess a thorough working knowledge of Data Base design requirements and the capabilities and limitations of IMS. You should also have the strong analytical abilities necessary to conceptualize and synthesize requirements and resource needs from diverse departments to develop feasible Data Bases. You must be familiar with Data Base modeling techniques. usage and potential of the IBM Data Dictionary in a DB DC environment and possess a strong IMS systems development background. Persuasive oral and written communications skills are also needed to present complicated technical data to non-technical employees and direct. interface and work effectively with all levels of management. staff. and outside vendors.

Your primary responsibilities will encompass managing the definition. documentation and control of resources. ensuring that they meet long and short term information needs You will also be accountable for providing input to evaluate business requirements. users with information availability. and management with direction on the growth of the DB DC facility.

The position affords you ample opportunity for participation in long range business decisions. Data Base design decisions. creativity and innovation in the utilization of Dictionary Systems. and in expanding the documentation function beyond the traditional DP environment.

SENIOR DATA BASE SPECIALIST INFORMATION REQUIREMENTS

You should possess thorough understanding of the functions performed by IMS DB DC software. as well as knowledge of Data Dictionary facilities and capabilities. In addition. your ability to apply and document dictionary Data Base content to the DB DC environment is essential. A good understanding of Data Base system design and methodology. including creating and maintaining the conceptual information model. and the ability to identify and interpret statistical data is important Your experience in the development of testing. auditing and security requirements for designing and implementing large scale. on-line commercial systems is also necessary.

Effective utilization. definition and documentation of the information resource. including: identifying information needs and data relationships required to support application systems: establishing standards and procedures to document the DB DC environment: establishing and enhancing the testing environment: and developing logical information structures will all come under your auspices. The primary challenge inherent to this position is to translate user information needs into data representations and relationships that allow for future flexibility A high degree of creativity is required in order to identify future needs and thus ensure that the design of the system will support future marketing strategies.

MANAGER DB/DC DESIGN

You should possess a detailed knowledge of IMS VS DB DC software. including physical storage characteristics. internals. scheduling and prioritization algorithms. backup recovery procedures. DLI batch and on-line programming techniques Your extensive background in the development of large DP systems. and strong problem-solving and decision-making capabilities will aid you in quickly identifying and resolving system failures. You must be able to translate complex technical data for non-technical employees. effectively oversee the activities of those in your department. and interface with all levels of management personnel and outside vendors.

You will be responsible for managing the development of the physical design and architectural structure of the DB DC environment to ensure effective utilization of the information resources and the flexibility to support future changes. whether in the information requirements or technological advances. In addition. you will be accountable for developing malfunction action plans and procedures and for coordinating the effective utilization of the DB DC environment. The major challenge will be to analyze and synthesize information requirements identified by the Information Management function and to translate them into a physical design structure to support current and future business requirements. Therefore. a great degree of creativity in selecting and developing the Data Base design is required

SENIOR DATA BASE SPECIALIST DB/DC DESIGN

You must possess a good understanding of IMS DB DC software. including physical and logical structures. message formating services. secondary indexing. backup recovery utilities. reorganization utilities. DLI batch and on-line programming techniques. In addition. knowledge of performance monitoring tools and modeling utilities. as well as background in technical disciplines such as TSO/SPF. O/S. VSAM and JCL are imperative. as is experience in the design and implementation of IMS application systems. You must be able to interface effectively with the managerial and staff personnel of several departments. Good analytical and problem-solving skills are necessary. particularly when assessing problem situations. evaluating and assessing design alternatives and providing debugging and consultative support.

This multi-faceted position entails your participating in the Data Base design process, while performing modeling functions and evaluating design decisions. In addition. you will implement backup. recovery and reorganization procedures. as well as provide assistance to application systems personnel by participating in call pattern walk-through and IMS debugging support.

SENIOR SOFTWARE PROGRAMMER

Ideally. you should possess 3-5 years background on the latest IBM mainframe equipment. preferably in either an MVS or DOS VSE environment. Excellent analytical and problem-solving skills are essential as well as a working knowledge of internal systems components to assist in their installation and modification. capacity planning and performance tuning.

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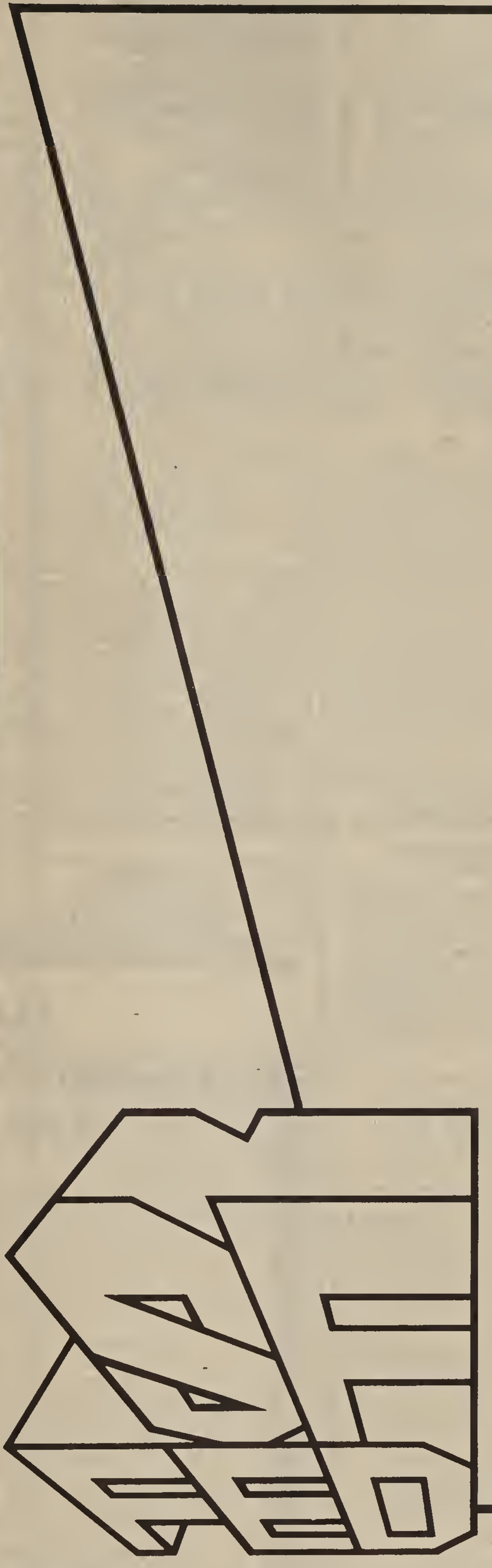

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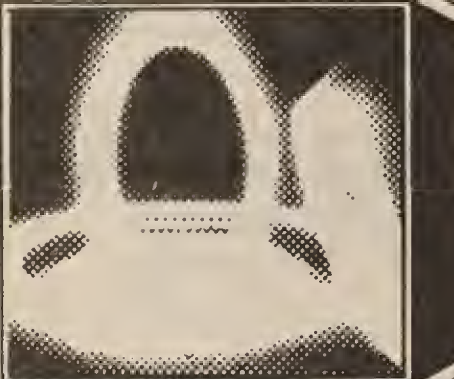

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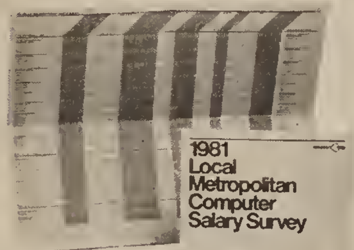

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DIRECTOR

MANAGEMENT INFORMATION SERVICES

LOF Glass, the largest division of Libbey-Owens-Ford Company, is seeking a director for its division-wide MIS activities.

Headquartered in Toledo, Ohio, the director will be responsible for the effective functioning of data centers and distributed processing sites located throughout the United States and Canada, the coordination of system development projects and the overall information systems plan.

The ideal candidate will be experienced in the management of a medium to large scale systems environment and will possess a bachelor's or master's degree in an appropriate discipline.

Salary and incentives commensurate with education and experience.

All qualified and interested individuals should submit a current resume and salary history to:

Director
Salaried Compensation & Employment
Libbey-Owens-Ford Company
811 Madison Avenue
Toledo, Ohio 43695

Equal Opportunity Employer - M/F

LOF

Data Security Specialist

Opportunity for D.P. Professional with relevant experience to make a significant contribution to an increasingly important and visible area

Our prominent, multi-billion dollar financial organization, located in beautiful North Central New Jersey, utilizes a highly sophisticated data base/telecommunications network, upon which we rely increasingly, for monitoring and recording all corporate activity. This newly-created function, reporting to the Assistant V.P./Director of Security, is designed for a degreed data processing professional with 3-5 years experience in associated security/protective applications. The successful candidate will undertake a variety of essential, frequently complex, assignments including:

- *Establish and develop standards and guidelines for data processing security and assist in their implementation.*
- *Establish procedures and conduct investigations concerning questionable business activities and all obvious misuse or abuse of corporate resources.*
- *Develop programs for control and positive identification of persons, devices, programs and systems processes as well as unauthorized remote job entry access to main systems (IBM OS environment).*
- *Provide periodic integrity testing; develop tape documentation for system, security classification, disaster recovery, off-hour security regulations, etc.*
- *Coordinate relevant training and awareness program for in-house personnel*

The vital importance of this function and its visibility within the highest executive levels of our organization make this position one of significant growth potential for the right individual.

**Salary offered will be commensurate
with experience and education.**

Qualified persons are requested to send detailed resume, in strictest confidence, specifying both current and desired income information. We will contact you promptly after reviewing your qualifications to make arrangements for a personal, in-depth interview.

**CW-A3042
375 Cochituate Rd
Box 880
Framingham, MA 01701
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We're Expanding Our Product Line Into Data Communications Equipment

This is your opportunity to get in on the ground floor and participate in the design and development of data communications systems. Our initial entry in the product line is a Communications Processor that will be functionally compatible with the IBM 3705, using LSI/VLSI and state-of-the-art microprocessor technology.

Our most immediate need is for hardware, software and firmware design and development specialists with extensive experience in one or more of the following: • SNA • X-25 • Bisync Start/Stop Protocols • 3704/3705 • NCP • Intel Microprocessors • Front-end Processors • Assembly Language • PASCAL.

If you're interested in an exceptional career opportunity with the world's largest manufacturer of high density tape data storage equipment and a major manufacturer of disk subsystems we want to hear from you. We offer an excellent compensation package that includes health & insurance benefits, stock purchase plan and more! For immediate consideration please send your detailed resume to **Mr. W.T. Marrow, STORAGE TECHNOLOGY CORPORATION, Dept. CW 7/27, 2270 So. 88th St., MD#29, Louisville, CO 80027.** We are an equal opportunity employer.

STC
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TECHNOLOGY
CORPORATION

Management Information Programmer Analysts

Career positions are open which require computer skills in Fortran, Basic and Mark IV plus strong business knowledge. The person selected will be involved with design, implementation and operations of M.I.S. for business units and do computer modeling for financial and manufacturing operations.

Position will involve file coordination of existing systems and management of new reporting formats. Past experience with M.I.S. design, handling and usage is necessary.

This is an excellent opportunity to work with high level languages, IBM 370 or Cyber 73 computers as well as the latest Tek graphic terminals. We offer strong future potential in EDP, business or financial management.

The Beautiful Pacific Northwest

...located near Portland, Oregon, we are within a two hour drive of the Cascade Mountains and the ocean beaches. The close-by natural playgrounds and the City of Portland provide a variety of recreational and cultural activities.

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Please send detailed resume and salary history to Iris Fuchs, Tektronix, Inc., P.O. Box 500, MS Y6-010, K-57, Beaverton, Oregon 97077.

We are an equal opportunity employer m/f/h.

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Computer Systems Chief Engineer
$20,035-$37,289

Requires a BS or BA Degree In Computer Science, Management Information, Business Administration, Mathematics, Engineering or a related discipline, plus extensive experience in more than one applicable technical area. Receipt of a related associate degree or suitable experience in systems analysis, skilled programming or computer operations management may substitute for college degree. Applicants should have extensive knowledge of state-of-the-art computer hardware and systems software, and a comprehensive ability to configure hardware and software measurement systems. Successful applicant will be responsible for providing assistance to State agencies by conducting quality assurance reviews of the overall DP program or selected portions thereof, such as DP installation management, DP security, and software/hardware optimization. Please send resume by Aug 21st, 1981 to:

**Department of MASD
Monroe Building, 6th Floor
101 North 14th Street
Richmond, VA 23219
Attn: Personnel Department**
EEO Employer

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Salary to high $20's

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Computer Science

A small liberal arts institution near Philadelphia seeks a person with background in data management, information systems, or software engineering to teach undergraduate courses and provide leadership to an expanding computer science curriculum. Especially sought is individual with C.D.P. or industrial experience with supportive academic credentials. Computer Resources include several mini computers and a large DEC 11/70. Ten month academic contract with consulting opportunities and summer teaching readily available. Rank and salary are open. Position starts Sept. 1981. Apply to:

**Dr. Arthur Hilt
Dept. of Mathematics
and Computer Science
Albright College
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Desirable background should include:

- performance analysis and measurement of TP networks
- communications capacity planning
- network design and optimization
- SNA
- experience with the installation and support of hardware/software for data communications

This position offers an opportunity to stay in tune with the technological advancements within the TP industry and allows the incumbent to be creative and imaginative. If you desire an environment where opportunity and challenge are facts and not just words in employment advertising, please forward your resume, including current and desired salary to us. All responses will be acknowledged.

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900 Asylum Avenue
Hartford, Connecticut 06105

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Small dynamic firm specializing in health care is looking for an experienced minicomputer specialist to lead product development and marketing activities. Supervisory experience is required, as well as a minimum of two years programming experience in high level languages. Knowledge of basic accounting practices is necessary. Understanding of medical office operations is desirable. If qualified please send resume including references and salary history to:

**Personnel Manager, SysteMetrics, Inc.
222 E. Anapamu St., Santa Barbara, CA 93101**

Computer Sales/Service

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SALES REPRESENTATIVES

Our PROGRAM PRODUCTS DIVISION Demands the Best from Professionals Who Have an Appointment with the Future

TECHNICAL SUPPORT REPRESENTATIVES

PRC's PROGRAM PRODUCTS DIVISION has career-oriented positions available for professionals whose career advancement is moving right on schedule. We are seeking individuals who are capable of providing technical support to our sales staff and enjoy working in a marketing environment. Responsibilities include: installing our proprietary software products at customer sites; training the customers to use the products, providing over-the-phone assistance to customers and generally assisting our sales staff with their dealings with clients.

You must have a minimum of two years application programming, one year in analysis and one year working knowledge of COBOL. Knowledge of IBM OOS and/or OS JCL, DEC RSX11M experience and a training/teaching background are highly desirable. These positions include travel time of several days 2 to 3 times each month.

SALES REPRESENTATIVES

Outstanding opportunities for individuals who can fit career advancement into their busy schedules! If you're ready to translate your sales, data processing and/or technical support experience and expertise into a potential management position marketing our outstanding new line of software products, Planning Research Corporation is the place for you in the 80's.

We'll provide the state-of-the-art technology and a superior product that we feel carries a "can't miss" label for the upcoming decade. We are seeking professional individuals with proven potential. Familiarity with data processing software products is a must and a data processing background would be helpful.

PRC currently has positions available for qualified Technical Support AND top-of-the-line Sales Representatives in:

Atlanta
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Dallas
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PRC can offer the right individuals a truly extraordinary compensation package, bonus plan, excellent benefits and the management opportunities you've been looking for. Qualified applicants are invited to call COLLECT, or forward your statement of qualifications including salary history to Ms. Lisa Kligman

Planning Research Corporation
PROGRAM PRODUCTS DIVISION

Planning Research Corporation

Corporate Personnel, 1764 Old Meadow Lane, McLean, Virginia 22102, **(703) 893-1800, Ext. 2379**

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DATA PROCESSING OPPORTUNITIES

DATA BASE ADMINISTRATOR

We are redeveloping many of our major financial and manufacturing systems in an on-line environment.

The selected candidate will assist in the design of the large data bases that will support these new applications. Previous data base design experience is a must, and knowledge of IMS, UCC10, Data Dictionary, or system design would be useful.

ANALYSTS

Join experts to create a new on-line, fully integrated financial information system and to provide technical direction for its use. You should be a highly motivated, technically oriented individual with 3 to 5 years D.P. experience, including IBM/MVS and COBOL. Data base/data communications experience would be a plus.

PROGRAMMERS

Be a part of our special projects team responsible for quick turn-around in business applications. We prefer 2 years COBOL programming in business applications using IBM/OS.

Send resume with salary history to:

Phyllis Page-Finger
Professional Employment,
Dept. D-15

Litton

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U.S. Citizenship/Permanent Visa Required

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Dunhill

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(704) 554 8771

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CENTRAL NEW JERSEY major division of a multinational company located in Central New Jersey is seeking a Programmer/Analyst with a minimum of 2 years experience in a CMS/DOS environment utilizing COBOL. Opportunity axists for the right individual to have total location responsibility within 1-2 years. Excellent benefits including tuition reimbursement and savings plan. If you have the skills and background to meet this exciting challenge, please submit work history and salary requirements in confidence to: **CW-A3041, Computerworld, Box 880, Framingham, MA 01701.**

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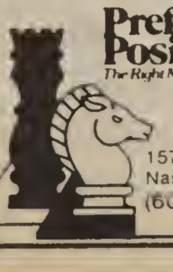

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Prefer BS/MS in Computer Science, Electrical Engineering or Math with experience in any of the following:

* **Engineering or scientific software design/testing**
* **Applications on minicomputers, microprocessors or ATE**
* **Design automation, CAD/CAM software**
* **FORTRAN, Pascal, Assembly or Ada**

UNIVAC SYSTEMS SOFTWARE ENGINEERS

Experience with Univac OS/1100 or Exec 8.

MIS BUSINESS ANALYSTS

Prefer Business degree or MBA with knowledge of management planning and control techniques, strong written and verbal communication skills, experience in structured analysis methodology and familiarity with data processing data base technology.

* Requires 3 years financial systems experience within a large government contracting, defense-oriented manufacturing industry. Knowledge of government cost accounting standards and C/SCSC (DODI 7000.2).
* Requires 3 years experience in manufacturing/material systems involving definition, design and implementation experience.

Forward resume to: Dotti Morris, Dept. 1092

MOTOROLA INC.
Government Electronics Division
Hayden Plant
8201 E. McDowell Rd., Scottsdale, AZ 85252

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TECHNICAL ASSISTANT

Florida's gold coast and TROPICANA, a growth company with vision, combined to create an exciting environment for an individual with technical support experience. Your computer science or mathematics degree and preferably 3 years experience in technical support in a distributed microprocessor based application environment could qualify you for this opportunity. Large Burroughs mainframe (6700-6800-7700) background a must.

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Our sophisticated computer environment offers you a real challenge and opportunity for success working within a diversified programming operation. You can take pride in having experience with the best.

With TROPICANA PRODUCTS you will use your recent degree in computer science and the knowledge of COBOL to program in our high growth environment.

To investigate this challenging opportunity send resume and salary history to C. Dowell, Dept. 1369

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COMPUTER OPERATIONS MANAGER
SANTA FE, NEW MEXICO

The New Mexico Automated Data Processing Division is seeking a highly qualified manager to direct the Division's Operations Bureau. The current operating environment includes an IBM 370/158 running MVS-SE and JES 2 with CICS, ATMS/STAIRS, ACF/ATAM, ACF/NCP, and IDMS, and a 3031 running MVS-SE and JES 2 under VM/SP with CMS.

Applicants should have significant operations and management experience and also be familiar with large computer operations centers, including budgeting and planning processes.

SALARY: Up to $35,000. Depending on qualifications.

Submit resume or contact Mr. Marlin Mackey, Deputy Director, ADPD, 715 Alta-Vista, Santa Fe, NM 87501, (505) 827-3271.

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Computer Consultant. Assigned to client company (user) to perform computer systems analysis and programming to solve manufacturing, management and information problems in manufacturing, insurance and other industries, employing a variety of hardware and software applications. 40 hours per week; $24,960 per year. Education: 2 years college, in Computer Science. Training: None required. Experience: 3 years, or 3 years as Computer Programmer. Must know COBOL computer language plus DL-I, POWER, IMS, TOTAL, ENVIRON-1, LIBRARIAN, CICS, IMS, and PANVALET-online. **Contact Mr. G.F. Strother, STROTHER ASSOCIATES, INC., 1118 W. Partridge Dr., Palatine, IL 60067.**

Data Processing Instructor

Work experience in programming. Teaching experience. College degree. Apply to:

Dr. James E. Cook
Kellogg
Community College
450 North Avenue
Battlecreek, MI 49016
Ph: (616) 965-3931

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Rapidly growing national company has excellent opportunity in our Medical Systems Division for an individual with at least three years of COBOL programming and systems analysis experience. Responsibilities include the analysis, design, and programming of on-line, data base-oriented applications to be installed in client health care institution. Hardware includes a Hewlett Packard HP 3000 Series 44 utilizing the IMAGE data base facility. Two-three years COBOL experience a must, HP or hospital experience a plus. Competitive salary, full company benefits, pleasant office environment. Interested candidates please send resumes to:

Personnel Department
National Medical Consultants
PO Box 996
Shawnee Mission, KS 66201
EOE

COMPUTERWORLD

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AMECOM offers an excellent growth opportunity to an experienced ATE Design Engineer with at least one year experience in developing software for GR 1797, 1792, 1796 and GR 2225 type equipment. Candidates should have experience in designing interface fixtures for Digital and Analog testing.

Excellent compensation and benefits. Please send your resume including salary history in confidence, or for more information, please contact:

KEVIN ATTANASIO
(301) 864-5600 (COLLECT)
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LITTON SYSTEMS, INC.
Amecom Division
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Holland, Michigan

As a leading manufacturer of office interior systems, Haworth is experiencing dramatic growth in an industry that is also expanding very rapidly. The result of the growth is reflected in the recent installation of an **IBM 4341 System** in an **MVS/IMS Environment.**

Systems Analysts, Programmer/Analysts: Qualified candidates are degreed professionals and highly motivated. Project assignments will be to develop and support sales, marketing and finance applications. Experience with 3270 terminals and CICS is a plus.

Information Center Specialist: Qualified candidates will be degreed professionals who possess five years combined experience in data processing with **one year** of exposure to report writers, preferably **Answer/DB, Answer 2** or **Mark IV.**

These are new positions created to support increasing sales volume.

We offer a competitive salary and benefits package plus a **liberal relocation** plan. If you are interested in joining a progressive and dynamic M.I.S. Department, we invite you to send your resume, including salary requirements, to:

Human Resources Department
HAWORTH, INC.
One Haworth Center • Holland, Michigan 49423

Equal Opportunity Employer

HAWORTH

Director of Data Processing

Administrative position entailing responsibility for all data processing activities and equipment, duties will also include departmental budget development. Excellent interpersonal communications skills required for liaison between computer center and staff faculty and administration.

Bachelor's degree, minimum 5 years' data processing experience, 2 years' experience equivalent to Assistant Director of Data Processing.

Salary range: $24,502 to $37,730. Send letter of application and resume by August 15, 1981 to:

Aaron Donsky
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Research and Development
LAKELAND COMMUNITY COLLEGE
Mentor, Ohio 44060

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R & D Engineers Computer Systems Design

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Operating System Designer

A minimum of two years experience in one or more of the following areas is required: real fault operating system design; fault tolerant system design; file systems and data base management system design; I/O system and peripheral development; or system backup and utilities program design. A BSCS or equivalent is also required.

Compiler Designer

A minimum of two years experience in one or more of the following areas is required: computer compiler design; designing FORTRAN, PASCAL, MODULA, PL/1 or ADA compilers; or designing FORTRAN I/O math libraries. A BSCS or equivalent is required.

Hardware Designer

A minimum of one year experience in one or more of the following areas is required: processor hardware design; solving RFI problems and dealing with FCC requirements; microprocessor hardware design; microcode tool development; system integraton; diagnostic development; peripheral integration and testing; or fault tolerant design. A BSEE or equivalent is required.

Hewlett-Packard offers a stimulating work environment and outstanding benefits including cash profit sharing, stock purchase plan, retirement plan plus medical, dental, disability and life insurance.

Send us your resume and tell us what you've been doing since earning your technical degree. We'd like to know your main areas of expertise, your professional achievements and why you can play an important role in helping us design computer systems for the future.

Send this information to Carlos Torres, Personnel Department B, Hewlett-Packard Company, 11000 Wolfe Road, Cupertino, CA 95014. We are an equal opportunity/affirmative action employer.

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For Business: OS/DOS/IMS/CICS/MVS/JES Prog/Anal/Systems/ Data Base. All large scale installations.

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Your name, resume, and present employer will not be given out without your permission.

For sincere personal service, please send a confidential resume to:

Dan Pullman (602) 274-5680
PULLMAN PERSONNEL
3003 North Central Ave. Suite 1706, Phoenix, Arizona 85012

Our Commitment To Position CAD/CAM/DP At The Leading Edge...

CAD/CAM/DP Career Open House
August 3rd and 4th
4 'til 9 PM
Le Baron Hotel, San Jose

In Less Than A Year...

...engineering computing at National Semiconductor has grown five-fold. More than just an ability to react, our commitment to CAD/CAM reflects an aggressive, "take-charge" philosophy —a philosophy that provides talented professionals with a challenging opportunity to contribute to ground-floor development in a young, exciting field.

National's commitment to CAD/CAM advancement is reflected in a variety of current projects, including VLSI Symbolic Layout, Geometric Verification, Topology Verification, Graphic Database, PCB, Gate Array and Logic Simulation applications. For an inside look at exciting opportunities in CAD/CAM and engineering computing programming and support, stop by our Open House, Monday or Tuesday, August 3rd or 4th to explore careers in these areas:

CAD Graphics R&D

- PCB Systems Programmers
- Project Management
- VLSI Verification Programmers
- Graphic Database
- Systems Programmers

Logic Simulation and Test

- Software Systems Programmers
- Engineering Management

Gate Arrays

- Project Management
- Software Systems Programmers

Computer-Aided Manufacturing

Encompassing all areas of the manufacturing cycle, this rapidly growing department is pledged to provide state-of-the-art computer process control and yield analysis capabilities for semiconductor manufacturing. Opportunities exist for talented professionals with experience in one or more of the following: Data Acquisition, Automatic Test Equipment, Database Design and Management Systems, Process Control Methods, Communications and Equipment Interfacing, Real-Time Numerical Control Systems and Pascal Programming.

Diverse projects offering a broad variety of techniques and technological resources provide exciting career opportunities for:

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- Technical Service Specialists

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National's Engineering Computer Center, recognized as one of the finest in the industry, is growing rapidly and offers ground-floor opportunity to DP professionals who are ready to advance their careers into Systems Programming. A wealth of resources you need to get the job done include:

- Three NAS AS/5000 Systems.
- A new AS/7000, planning for another soon.
- Two Comten Front-end Processors with over 60 RSCS and CMS lines.
- VM/SP
- RAMIS, VS Fortran and DMS.
- Fortran, Pascal, PL/1, ALC and Script tools.
- Eventual world-wide networking.
- Extensive remodeling is underway now.

Opportunities include:

- VM Programmers
- Technical Support Specialists
- Applications Programmers
- Computer Operators

Talk to our managers Monday or Tuesday about exciting opportunities to support applications such as CAD Graphics R&D, Circuit Analysis & Modeling, Logic Simulation and Test, CAM and Gate Arrays as well as opportunities in the ECC.

If you're unable to attend our Open House, please send your resume in confidence to Jane Molyneux, Professional Staffing and Placement, National Semiconductor, Dept. 04-51-522, P.O. Box 60879, Sunnyvale, CA 94088. Or call (408) 737-5640. We are an equal opportunity affirmative action employer.

National Semiconductor

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Dynamic Software Development firm seeks experienced IBM COBOL IMS & CICS professionala. Excellent potential advancement into management. All feea, interview and relocation expenses paid by client company. For immediate consideration send resume today.

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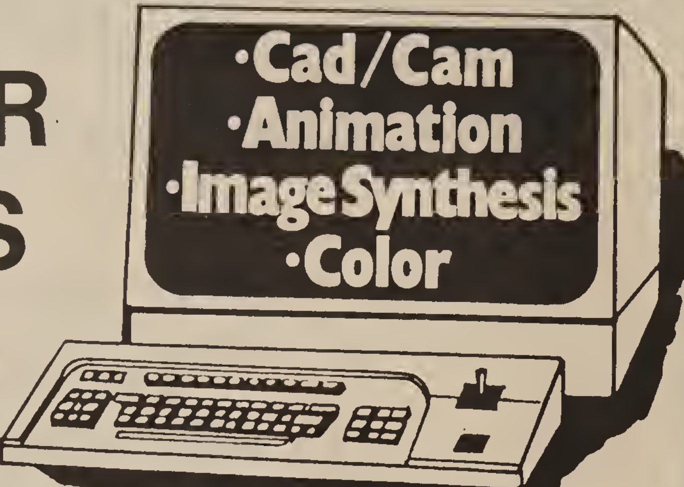
Suite 700 One Cherry Hill Mall
Cherry Hill New Jersey 08002
(609) 667 4488

RSVP SERVICES, Dept C
Suite 230 Dublin Hall
1777 Walton Road
Blue Bell Penna 19422
(215) 629 0595

RSVP SERVICES
Employment Agents for Computer Professionals

LUNDY ELECTRONICS & SYSTEMS HAS GROUND FLOOR OPPORTUNITIES IN

COMPUTER GRAPHICS



Our high performance graphics terminals are the most exciting product on the market today and we want the software to be even better. Join our rapidly expanding graphics software group and go as far and as fast as your talent will take you.

SYSTEMS ANALYSTS/PROJECT LEADERS

Must have technical degree and significant expertise in one of the following areas: CAD/CAM, 3-D Animation, solid geometric modelling, color displays.

PROGRAMMERS

Must have B.S. degree and knowledge of Fortran. Graphics exposure desirable.

If you will be attending SIGGRAPH '81 and would like to arrange an interview while there, please call (516) 671-9000 for an appointment or send resume to:

Mr. Peter Krajeski
LUNDY ELECTRONICS & SYSTEMS
Glen Head, New York 11545

LUNDY

An Equal Opportunity Employer M/F

EDP

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One of the country's major health service organizations has excellent opportunity for qualified professional to fill a high visibility career position in our expanding EDP Audit Dept.

You will be responsible for planning activities, directing audits, and determining the adequacy and validity of controls over applications and systems. "Big 8" audit experience is preferred, and CISA, CIA or CDP is desirable. Excellent written and oral communications skills are essential.

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Major Oil & Gas Corporation has opportunity in Oklahoma for programmers. Degree in Computer Science or Math. Entry level to 3 years experience in FORTRAN and PL/1 on IBM 33/33. Make your move now!

SYSTEMS ANALYST

International design engineering firm has Systems Analyst opportunities. Degree in Computer Science and/or 5-10 years experience in oil, petrochemical, or related industries. IBM 360/OS, 370, 303X, 43XX, Operating Systems- 360/OS, OS/US2, HASP, JES 2, JES 3 environment. Additional skills in TSO, SPF, PL/1, COBOL, JCL desirable. Houston based.

EDP AUDIT

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CORPORATE SYSTEMS ANALYST

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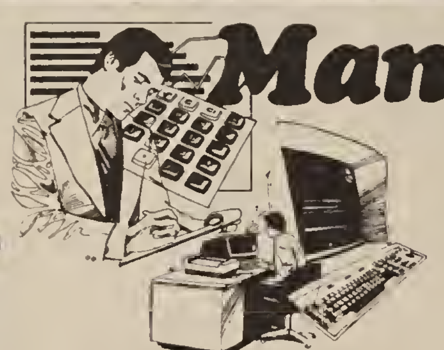

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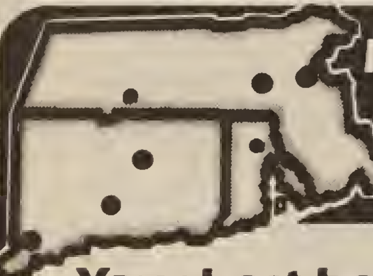

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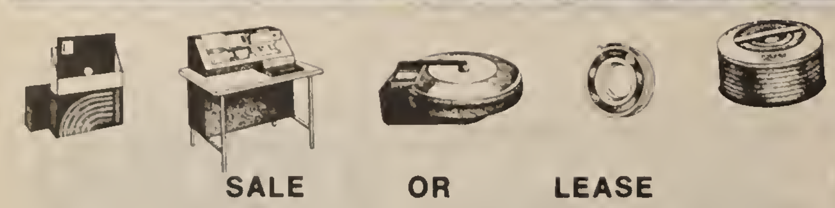

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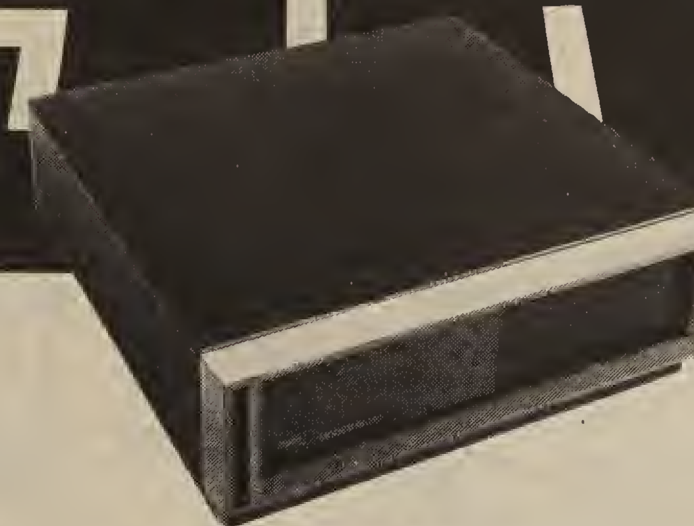

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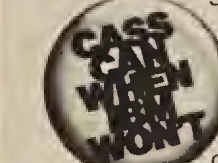

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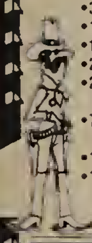

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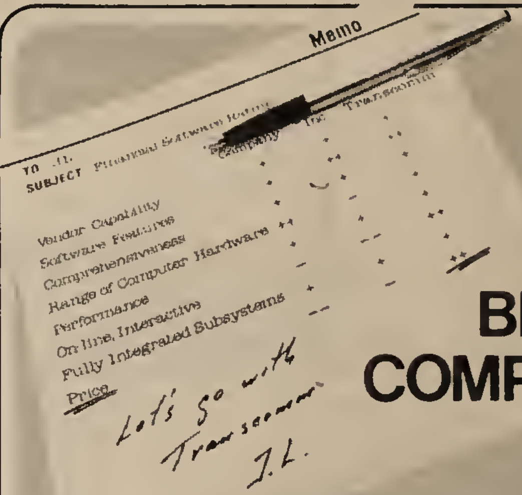

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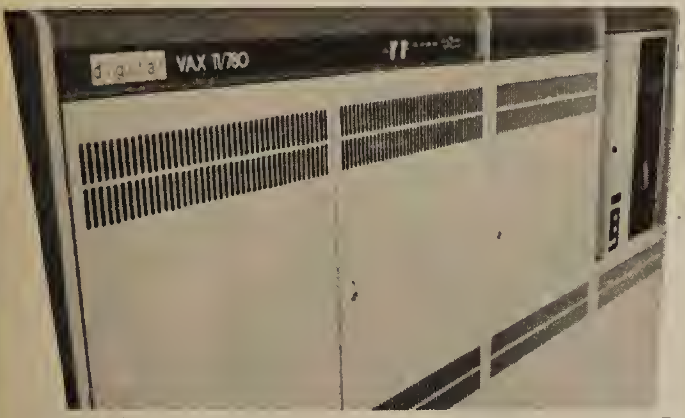

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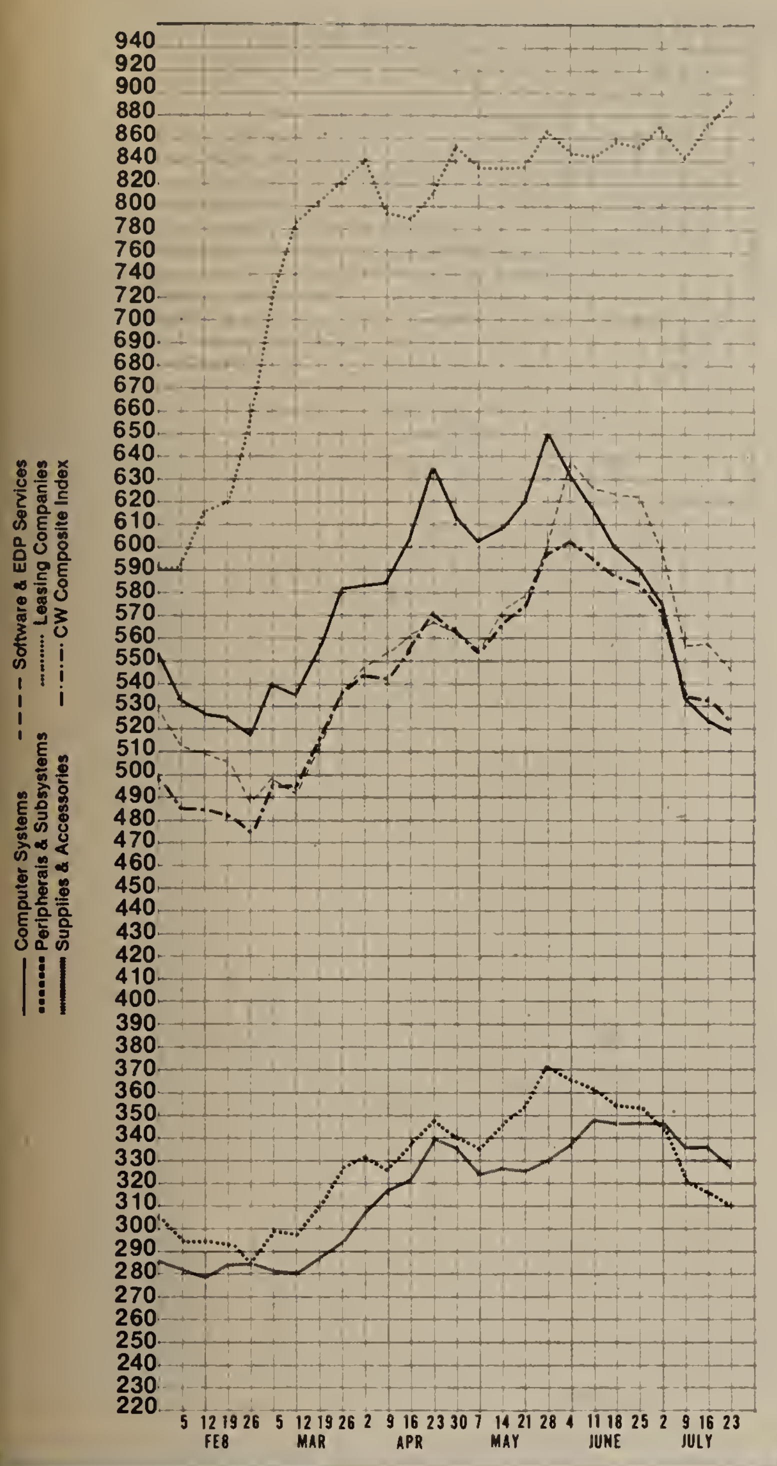
Computerworld Stock Trading Index



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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JULY 22, 1981

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

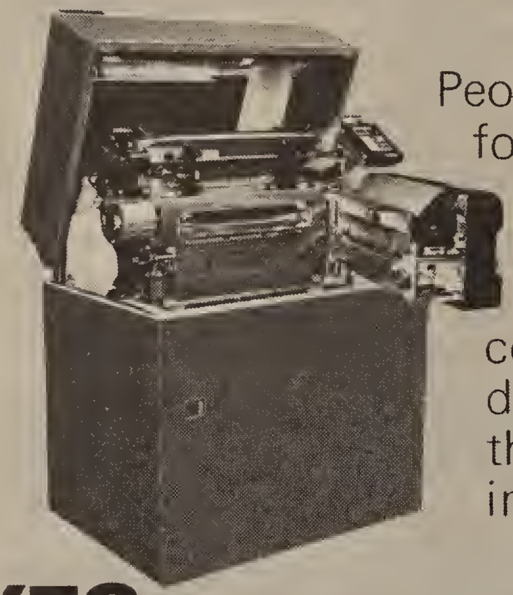
EXCH		PRICE			
		1980-81 RANGE (1)	CLOSE JUL 22 1981	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	15- 45	31 5/8	+2 1/2	+8.5
N	BURROUGHS CORP	36- 88	38	-1	-2.7
O	COMPUTER AUTOMATION	9- 27	14 1/2	+2 1/2	+20.8
N	CONTROL DATA CORP	35- 84	68 3/8	- 3/4	-1.0
D	CRAY RESEARCH INC	10- 49	32 5/8	+ 3/8	+1.1
N	DATA GENERAL CORP	46- 87	51	-1 3/4	-3.3
N	DATAPOINT CORP	22- 66	51	+1	+2.0
N	DIGITAL EQUIPMENT	52-113	93 3/4	+ 1/8	+0.1
A	EECO INC	6- 19	11 1/8	-1 3/8	-11.0
N	ELECTRONIC ASSOC.	6- 12	6 3/4	- 1/8	-1.8
N	FOUR-PHASE SYSTEMS	19- 49	33 3/4	- 1/4	-0.7
N	FOXBORO	31- 62	47 3/4	- 3/4	-1.5
O	GENERAL AUTOMATION	7- 19	10 7/8	- 7/8	-7.4
O	GRI COMPUTER CORP	1- 3	1 1/4	0	0.0
N	HARRIS CORP	25- 60	44 3/4	- 5/8	-1.3
N	HEWLETT-PACKARD CO	22- 54	44 3/8	0	0.0
N	HONEYWELL INC	65-115	86 1/8	0	0.0
N	IBM	50- 79	55 1/8	-1 1/2	-2.6
C	MAGNUSON COMP SYSTS	19- 46	18 1/2	-3 1/4	-14.9
N	MANAGEMENT ASSIST	9- 25	13 7/8	-1 1/8	-7.5
O	MINI-COMPUTER SYST	1- 5	2 1/8	- 1/4	-10.5
N	MODULAR COMPUTER SYS	9- 31	11 5/8	+ 3/4	+6.9
N	MOHAWK DATA SCI	10- 31	18	- 7/8	-4.6
N	NCR	52- 82	57 1/2	-2 7/8	-4.7
N	PRIME COMPUTER INC	10- 49	27 1/4	- 7/8	-3.1
N	PERKIN-ELMER	13- 35	23 7/8	- 1/2	-2.0
N	SPERRY CORP	40- 65	40 1/2	-1 1/4	-2.9
C	TANDEM COMPUTERS INC	10- 35	28 3/4	+3 5/8	+14.4
N	TEXAS INSTRUMENTS	79-150	92 7/8	+2 3/4	+2.0
A	WANG LABS.	17- 60	30	+1 1/2	+5.2
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	13- 27	25 3/4	+1	+4.0
N	COMDISCO INC	6- 24	20 5/8	-1 1/8	-5.1
A	COMMERCE GROUP CORP	1- 2	1	0	0.0
A	COMPUTER INVSTRS GRP	1- 4	5/8	0	0.0
O	CONTINENTAL INFO SYS	2- 15	8	+ 1/2	+6.6
A	DCL INC	3- 6	3 3/4	+ 1/8	+3.4
N	DPF INC	5- 12	9 3/8	- 1/2	-5.0
O	ITEL	1- 15	1	+ 1/8	+14.2
O	LEASPAC CORP	1- 2	3/8	0	0.0
A	PIONEER TEX CORP	2- 4	4 1/4	+ 5/8	+17.2
N	RELIANCE GROUP INC	24- 99	86 3/4	-4	-4.4
N	U.S. LEASING	12- 30	22 1/4	- 3/4	-3.2

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		PRICE			
		1980-81 RANGE (1)	CLOSE JUL 22 1981	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6	5	0	0.0
O	ADVANCED SYSTEMS INC	10- 15	11	- 3/4	-6.3
O	ANACOMP INC	8- 18	14 5/8	- 3/4	-4.8
O	ANALYSTS INTL CORP	3- 14	6	- 1/2	-7.6
A	APPLIED DATA RES.	6- 25	18 1/8	- 5/8	-3.1
N	AUTOMATIC DATA PROC	15- 32	28	+1 1/2	+5.6
O	CGA COMPUTER ASSOC	8- 17	8 1/2	-2	-19.0
O	COMPUTER HORIZONS	1- 5	3	+ 3/8	+14.2
O	COMPUTER NETWORK	4- 8	4 5/8	0	0.0
N	COMPUTER SCIENCES	11- 30	16 3/4	- 3/4	-4.2
O	COMPUTER TASK GROUP	1- 23	18	- 1/2	-2.7
O	COMPUTER USAGE	2- 10	3	0	0.0
O	COMSHARE	11- 21	12 1/4	-1 3/4	-12.5
O	CULLINANE DATABASE	18- 69	48	+ 1/2	+1.0
D	DATA DIMENSIONS INC	1- 6	1 3/8	0	0.0
D	DATATAB	1- 4	2 5/8	- 1/2	-16.0
D	OSI CORP	4- 9	6	+ 1/2	+9.0
O	OYATRON CORP	4- 11	6 1/4	- 1/2	-7.4
N	ELECTRONIC DATA SYST	10- 30	25	-2 1/8	-7.8
O	INFORMATICS INC	9- 33	21	-1 1/4	-5.6
O	INSYTE CORP	1- 3	2 1/4	+ 1/8	+5.8
O	IPS COMPUTER MARKET.	1- 4	1 1/2	0	0.0
O	KEANE ASSOCIATES	3- 9	7	+ 1/4	+3.7
A	LOGICON	12- 38	31	0	0.0
O	MNGT SCI AMER INC	17- 26	19	-1	-5.0
O	MATHEMATICA INC	5- 19	14 1/2	+ 1/2	+3.5
O	MATHEMATICAL APP GRP	7- 33	19 1/2	-2	-9.3
O	NATIONAL DATA CORP	5- 27	18 7/8	- 3/8	-1.9
N	PLANNING RESEARCH	5- 13	6 3/4	- 3/8	-5.2
O	PROGRAMMING & SYS	1- 2	1 5/8	0	0.0
O	RAPIDATA INC	4- 11	7 3/4	+ 7/8	+12.7
O	REYNOLDS & REYNOLD	19- 34	19 3/4	- 1/2	-2.4
O	STSC INC	6- 28	16 3/4	-1 1/2	-8.2
C	SCIENTIFIC COMPUTERS	3- 17	9	+ 1/4	+2.9
N	TYMSHARE INC	17- 56	42 1/4	+1	+2.4
A	URS CORP	5- 17	13 3/8	+ 1/8	+0.9
N	WYLY CORP	4- 20	10 3/8	- 3/4	-6.7
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	11- 24	12	- 1/2	-4.0
A	ANDERSON JACOBSON	9- 25	17 3/4	-1 1/2	-7.7
O	AUTO-TROL TECHNOLOGY	14- 62	14 3/4	+ 3/4	+5.3
O	BEEHIVE INT'L	2- 18	11 1/2	- 1/4	-2.1
A	BOLT,BERANEK & NEW	8- 25	17 7/8	- 1/8	-0.6
N	BUNKER RAMO	17- 56	53	-1 7/8	-3.4
O	CAMBEX CORP	1- 9	5 7/8	- 5/8	-9.6
N	CENTRONICS DATA COMP	11- 55	11 1/8	- 3/8	-3.2
A	CETEC CORP	3- 8	6	- 1/4	-4.0
O	COMPUTER DEVICES INC	5- 10	6 1/2	- 1/8	-1.8
O	COGNITRONICS	1- 11	7 1/4	- 1/2	-6.4
O	COMPUTER COMMUN.	1- 10	1 3/4	+ 1/4	+20.8
O	COMPUTER CONSOLES	4- 37	22 7/8	-2 5/8	-10.2
O	COMPUTER TRANSCEIVER	1- 8	5 3/4	+ 1/2	+9.5
N	COMPUTERVISION CORP	12- 48	36 1/4	- 3/8	-1.0
N	CONRAC CORP	13- 27	23 3/4	0	0.0

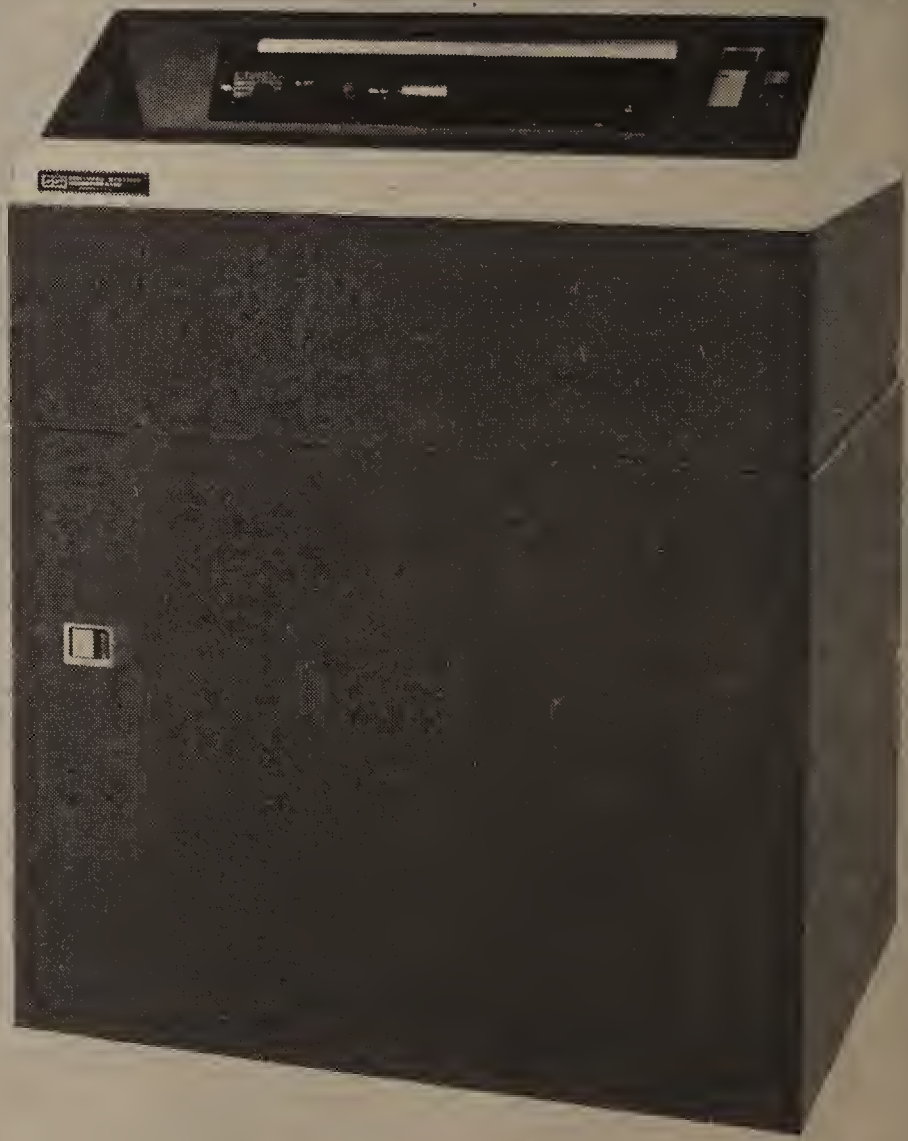
EXCH		PRICE			
		1980-81 RANGE (1)	CLOSE JUL 22 1981	WEEK NET CHNGE	WEEK PCT CHNGE
A	DATA ACCESS SYSTEMS	8- 23	7 1/2	- 1/4	-3.2
A	DATAPRODUCTS CORP	11- 44	26 3/4	+1 1/2	+5.9
O	DATUM INC	2- 5	2 5/8	0	0.0
O	DECISION DATA COMPUT	2- 8	3	- 1/2	-14.2
O	DELTA DATA SYSTEMS	1- 4	3 5/8	- 1/4	-6.4
D	DATARAM CORP	6- 37	7 5/8	- 3/4	-8.9
N	ELECTRONIC M & M	3- 8	4 5/8	- 1/8	-2.6
O	EVANS & SUTHERLAND	7- 39	27	+1	+3.8
D	FABRI-TEK	1- 8	4 3/4	- 1/4	-5.0
O	GENERAL COMPUTER SYS	1- 12	8	0	0.0
O	GEN'L DATA COMM IND	8- 22	11 3/4	- 3/8	-3.0
O	GENERAL TERMINAL CP	1- 4	1 1/4	- 1/8	-8.6
N	HAZELTINE CORP	12- 33	26 1/4	- 1/8	-0.4
O	INFORMATION INTL INC	8- 17	12 1/4	- 1/2	-3.9
O	INTEL CORP	23- 50	33	-1 1/2	-4.3
A	LUNDY ELECTRONICS	4- 17	12 7/8	+ 1/4	+1.8
O	MSI DATA CORP	5- 27	16 7/8	- 7/8	-4.9
N	MEMOREX	9- 34	9	- 1/4	-2.7
D	NETWORK SYSTEMS CORP	14- 25	19 1/4	+ 3/4	+4.0
O	OMEX	2- 12	12	0	0.0
A	PARADYNE CORP	9- 50	41 1/8	+2 1/4	+5.7
A	PENRIL CORP	9- 17	11 3/4	- 3/4	-6.0
O	RAMTEK CORP	10- 23	11 3/8	-1	-8.0
O	RECOGNITION EQUIP	5- 21	10 3/4	- 1/4	-2.2
O	SCAN DATA	1- 5	2	0	0.0
N	STORAGE TECHNOLOGY	12- 35	28 1/2	+ 3/4	+2.7
O	SYKES DATATRONICS	5- 25	21	- 1/2	-2.3
O	T BAR INC	14- 24	15	- 1/8	-0.8
A	TEC INC	3- 9	5 1/4	+ 1/8	+2.4
N	TEKTRONIX INC	42- 70	50 3/4	-2	-3.7
N	TELEX	3- 9	6 1/2	- 3/8	-5.4
O	TESDATA SYSTEMS CP	8- 26	9 1/2	- 1/2	-5.0
A	TIMEPLEX INC	5- 22	12	- 7/6	-6.7
C	WILTEK INC	1- 3	2	0	0.0
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	8- 17	15	- 1/2	-3.2
O	BALTIMORE BUS FORMS	1- 2	1 1/4	0	0.0
N	BARRY WRIGHT	8- 23	18 3/4	- 3/4	-3.8
O	CYBERMATICS INC	1- 2	1 1/8	0	0.0
A	DUPLEX PRODUCTS INC	11- 16	14 5/8	- 1/4	1.6
N	ENNIS BUS. FORMS	13- 22	20 1/2	- 3/4	-3.5
N	3M COMPANY	46- 65	50 7/8	-3 3/8	-6.5
C	MOORE CORP LTD	27- 38	35 1/2	- 1/4	-0.6
N	NASHUA CORP	18- 35	18 3/8	-1 1/4	-6.3
C	STANDARD REGISTER	22- 28	24 3/4	0	0.0
A	TAB PRODUCTS CO	9- 30	21 5/8	-1 7/8	-7.9
N	WALLACE BUS FORMS	12- 31	31	+1 3/4	+5.9

Looking for a quiet, tough printer system? Southern Systems has it. The QT Family.



People have been talking about The QT for a long time. They didn't call it The QT, of course. They just talked about the ideal line printer system — one that would be both durable and easy to operate, a low-cost system with great versatility and dependability. Give us a line printer system, they said, with one answer to my most important needs:

YES



- ☑ Do the QT printer systems give me a choice of 300, 600, 1000 & 1200 lpm?
- ☑ Does the QT family set the standard for quietness?
- ☑ Are they built for production DP applications?
- ☑ Are the bands heavy duty steel? Operator changeable?
- ☑ Are they easy to maintain?
- ☑ Is the print quality top-caliber?
- ☑ Is there a diagnostic display? Internal self test?
- ☑ Towel ribbon? Forms alignment? Membrane touch control?
- ☑ Does SSI guarantee compatibility with my computer?
- ☑ Is service available nationwide?
- ☑ Is the QT line printer family affordable and cost-effective?

There's just one other answer you might need: "Delivery in approximately 30 days."

Tell me about your printers from:
__ 200-300 lpm __600-900 lpm __1000-plus lpm
__Parallel interfacing __Serial interfacing (Synchronous or asynchronous)

My computer system is ____________
Name ____________
Title ____________
Company ____________
Address ____________
City ____________ State ____________ Zip ____________
Telephone ____________ CW

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